

# MATHEMATICS CONCEPTS MATHEMATICS ITEMS

The *Mathematics Concepts and Mathematics Items* book contains the released TIMSS mathematics assessment items. These are the released items from the 1999 and 2003 assessments (as distinct from the secure items, which are kept confidential so that they may be used in subsequent cycles to monitor trends).

#### Guide to Using the Mathematics Concepts and Mathematics Items Materials

The materials contained in this book can be used in a number of ways as a tool to assist teachers in making a formative assessment of student knowledge and skills. Some of these ways include the following:

**Teacher-designed formative assessments.** A teacher might, for example, decide to examine how well his or her class can solve routine problems. In such a case, the first step would be to review the questions in *Mathematics Concepts and Mathematics Items*, selecting the ones of interest. Ready-to-use versions of these items can be found in the *Mathematics Items* book. Teachers can print these items or present them to students on an overhead. Student responses can be scored by referring to the appropriate page in *Mathematics Concepts and Mathematics Items*. Teachers can also compare the overall percentage of students responding correctly to the international benchmark for that item.

**Feedback on teaching.** To the extent that the items coincide with concepts taught, the teacher might follow the same process to gain rapid feedback on the success of the teaching episode.

**Understanding misunderstandings.** Again, a teacher might decide to examine the incorrect or partially correct responses of the class for insight into any general misunderstandings, with a view to re-teaching a particular topic or skill.

**Identifying individual difficulties.** In the same way, the teacher might use the items to identify particular difficulties experienced by individual students, as the basis for some remedial teaching or focused practice.





This book contains the released items from both TIMSS 1999 and TIMSS 2003. Due to slight revisions in terminology and released information between cycles, the format for the items in each cycle differs slightly. Each item appears on a single page and is accompanied by a number of descriptors.

#### 1999 Content Domains:

- · Fractions and number sense
- Algebra
- Measurement
- Geometry
- · Data representation, analysis, and probability

#### 2003 Content Domains:

- Algebra
- Data
- Geometry
- Measurement
- Number

#### 1999 Cognitive Domains:

- Knowing
- Using routine procedures
- Investigating and problem solving
- · Mathematical reasoning
- Communicating

#### 2003 Cognitive Domains:

- Knowing facts and procedures
- Using concepts
- Solving routine problems
- Reasoning

Take a look at Calories in a portion of food from ratio, the name given to the first 1999 item in this book. As specified in boxes at the top of the page, the content domain for this item is fractions and number sense and the cognitive domain is investigating and solving problems. Looking at Value of -3x given value of x, the first item from TIMSS 2003 (page 85), the content domain (algebra) and the cognitive domain (knowing facts and procedures) are also accompanied by the Main Topic (algebraic expressions).

International item numbers identify each item. This number appears just below the item box.

**Correct answers** are shown beneath each item. These correct answers take two forms:

- **Letter code**. This form is used for the correct response on multiple-choice items. *Calories in a portion of food from ratio* provides an example of the letter code type—the correct answer is A.
- **Scoring guide**. This form is used to assist in scoring write-in responses. *Division of fractions* (J12) further along in the *Fractions and number sense* domain (page 13), provides an example of the scoring guide approach, indicating the general nature of correct and incorrect responses. In some cases, partial credit may be awarded and these items will provide guidelines for fully correct, partially correct, and incorrect responses.

**Sample student responses** are provided for TIMSS 2003 extended response items. An example of an actual U.S. eighth-grade student's response is provided for each scoring category. See item M032557 on page 89.

**International benchmarks** are provided in a table next to each item. These consist of statistics on the percentage of students in each country who answered the question correctly. The countries are ordered in terms of this percentage. The international average is included as well, and this display also indicates which countries scored significantly higher, significantly lower, and not significantly different from this international average.



Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

# Calories in portion of food from ratio

If there are 300 calories in 100 g of a certain food, how many calories are there in a 30 g portion of this food?
A. 90
B. 100
C. 900
D. 1000
E. 9000

Item Number: B08

# Overall Percent Correct

Singapore	90	<b>A</b>
Korea, Rep. of	86	
Hong Kong, SAR	84	
Chinese Taipei	84	
Slovak Republic	78	
Malaysia	78	
Belgium (Flemish)	78	
Czech Republic	76	
Russian Federation	76	
Thailand	75	
Slovenia	75	
Cyprus	74	
Macedonia, Rep. of	74	0
Italy	74	
Moldova	73	0
Canada	73	
Hungary	73	0
Romania	72	0
Australia	72	0
Netherlands	71	0
Latvia (LSS)	70	0
England	70	0
International Average	e 69	
Tunisia	69	0
New Zealand	69	0
Bulgaria	68	0
United States	68	0
Turkey	66	0
Israel	66	0
Iran, Islamic Rep.	66	0
Finland	65	$\blacksquare$
Japan	63	•
Chile	62	$\blacksquare$
Jordan	56	$\blacksquare$
Indonesia	56	* * * * * * * * * * * * * * * * * * *
Lithuania	54	$\blacksquare$
Morocco	53	•
Philippines	42	•
South Africa		_
30utii Airica	37	•

Country average vs. International average:

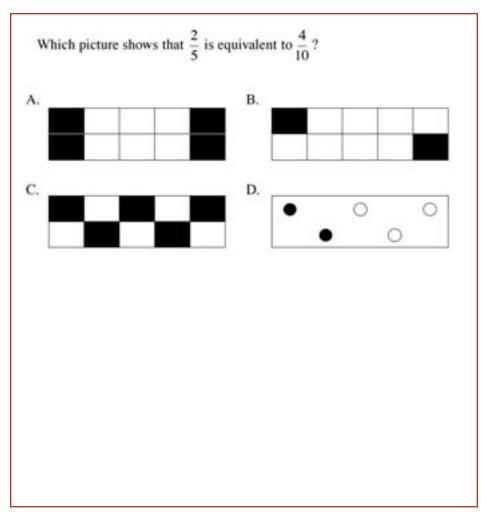
Higher
Not different
Lower

**Correct Response:** 

Α

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Figure showing equivalent fractions



Item Number: B09

# **Overall Percent Correct**

Singapore	83	<b>A</b>
Hong Kong, SAR	82	
Korea, Rep. of	81	
Japan	81	
Chinese Taipei	80	
Malaysia	76	
Belgium (Flemish)	74	
Canada	72	
Netherlands	69	
Slovenia	67	
Australia	65	
Finland	63	
United States	63	
Cyprus	62	0
Russian Federation	62	0
Thailand	61	0
England	60	0
Italy	60	0
Israel	59	0
Philippines	58	0
International Average	58	
International Average New Zealand	58	0
New Zealand Iran, Islamic Rep.	58 56	0
New Zealand	58 56 54	0
New Zealand Iran, Islamic Rep. Moldova Hungary	58 56 54 53	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria	58 56 54 53 52	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic	58 56 54 53 52 52	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania	58 56 54 53 52 52 51	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan	58 56 54 53 52 52	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS)	58 56 54 53 52 52 51 49	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan	58 56 54 53 52 52 51 49	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic	58 56 54 53 52 52 51 49 48 46 46	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile	58 56 54 53 52 52 51 49 48 46 46	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia	58 56 54 53 52 52 51 49 48 46 46 46	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of	58 56 54 53 52 52 51 49 48 46 46 46 46	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of Romania	58 56 54 53 52 52 51 49 48 46 46 46 46 45	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of Romania Tunisia	58 56 54 53 52 52 51 49 48 46 46 46 46 45 44	0
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of Romania Tunisia South Africa	58 56 54 53 52 52 51 49 48 46 46 46 45 44 33 29	0 0 <b>V</b>
New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of Romania Tunisia	58 56 54 53 52 52 51 49 48 46 46 46 46 45 44	0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Α

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

#### Smallest decimal fraction

Which of these is the smallest number?
A. 0.625
B. 0.25
C. 0.375
D. 0.5
E. 0.125

Item Number: B10

# Overall Percent Correct

Hong Kong, SAR         83           Korea, Rep. of         82           Netherlands         74           Japan         73           Finland         70           Chinese Taipei         69           Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           International Average         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         7           Jordan	Singapore	86	
Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         27           Jordan         26           Macedonia, Rep. of         25           Chile         14           Iran, Islamic Rep.         10           Indonesia         9           Turkey         9	Hong Kong, SAR	83	
Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         27           Jordan         26           Macedonia, Rep. of         25           Chile         14           Iran, Islamic Rep.         10           Indonesia         9           Turkey         9	Korea, Rep. of	82	
Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         27           Jordan         26           Macedonia, Rep. of         25           Chile         14           Iran, Islamic Rep.         10           Indonesia         9           Turkey         9	Netherlands	74	
Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         27           Jordan         26           Macedonia, Rep. of         25           Chile         14           Iran, Islamic Rep.         10           Indonesia         9           Turkey         9	Japan	73	
Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         27           Jordan         26           Macedonia, Rep. of         25           Chile         14           Iran, Islamic Rep.         10           Indonesia         9           Turkey         9	Finland	70	
Belgium (Flemish)         67           Lithuania         61           Canada         61           Slovak Republic         60           Czech Republic         59           Malaysia         59           Slovenia         58           Australia         58           Hungary         55           Russian Federation         53           United States         51           Latvia (LSS)         49           Bulgaria         46           England         45           Thailand         45           New Zealand         43           Italy         37           Tunisia         34           Morocco         31           Moldova         31           Israel         29           Romania         28           Cyprus         27           Jordan         26           Macedonia, Rep. of         25           Chile         14           Iran, Islamic Rep.         10           Indonesia         9           Turkey         9	Chinese Taipei	69	
Malaysia       59         Slovenia       58         Australia       58         Hungary       55         Russian Federation       53         United States       51         Latvia (LSS)       49         Bulgaria       46         International Average       46         England       45         Thailand       45         New Zealand       43         Italy       37         Tunisia       34         Morocco       31         Moldova       31         Israel       29         Romania       28         Cyprus       27         Jordan       26         Macedonia, Rep. of       25         Chile       14         Iran, Islamic Rep.       10         Philippines       10         Indonesia       9         Turkey       9	Belgium (Flemish)	67	
Malaysia       59         Slovenia       58         Australia       58         Hungary       55         Russian Federation       53         United States       51         Latvia (LSS)       49         Bulgaria       46         International Average       46         England       45         Thailand       45         New Zealand       43         Italy       37         Tunisia       34         Morocco       31         Moldova       31         Israel       29         Romania       28         Cyprus       27         Jordan       26         Macedonia, Rep. of       25         Chile       14         Iran, Islamic Rep.       10         Philippines       10         Indonesia       9         Turkey       9	Lithuania	61	
Malaysia       59         Slovenia       58         Australia       58         Hungary       55         Russian Federation       53         United States       51         Latvia (LSS)       49         Bulgaria       46         International Average       46         England       45         Thailand       45         New Zealand       43         Italy       37         Tunisia       34         Morocco       31         Moldova       31         Israel       29         Romania       28         Cyprus       27         Jordan       26         Macedonia, Rep. of       25         Chile       14         Iran, Islamic Rep.       10         Philippines       10         Indonesia       9         Turkey       9	Canada	61	
Malaysia       59         Slovenia       58         Australia       58         Hungary       55         Russian Federation       53         United States       51         Latvia (LSS)       49         Bulgaria       46         International Average       46         England       45         Thailand       45         New Zealand       43         Italy       37         Tunisia       34         Morocco       31         Moldova       31         Israel       29         Romania       28         Cyprus       27         Jordan       26         Macedonia, Rep. of       25         Chile       14         Iran, Islamic Rep.       10         Philippines       10         Indonesia       9         Turkey       9	Slovak Republic	60	
Malaysia       59         Slovenia       58         Australia       58         Hungary       55         Russian Federation       53         United States       51         Latvia (LSS)       49         Bulgaria       46         International Average       46         England       45         Thailand       45         New Zealand       43         Italy       37         Tunisia       34         Morocco       31         Moldova       31         Israel       29         Romania       28         Cyprus       27         Jordan       26         Macedonia, Rep. of       25         Chile       14         Iran, Islamic Rep.       10         Philippines       10         Indonesia       9         Turkey       9	Czech Republic	59	
Australia 58 A Hungary 55 A Russian Federation 53 O United States 51 O Latvia (LSS) 49 O Bulgaria 46 O  International Average 46 England 45 O Thailand 45 O New Zealand 43 O Italy 37 Tunisia 34 V Morocco 31 V Moldova 31 V Israel 29 V Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 Philippines 10 Indonesia 9 Turkey 9	Malaysia	59	
Hungary 55 Russian Federation 53 United States 51 Latvia (LSS) 49 Bulgaria 46 International Average 46 England 45 Thailand 45 New Zealand 43 Italy 37 Tunisia 34 Morocco 31 Moldova 31 Israel 29 Romania 28 Cyprus 27 Jordan 26 Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 Philippines 10 Indonesia 9 Turkey 9	Slovenia	58	
Hungary 55 Russian Federation 53 United States 51 Latvia (LSS) 49 Bulgaria 46 International Average 46 England 45 Thailand 45 New Zealand 43 Italy 37 Tunisia 34 Morocco 31 Moldova 31 Israel 29 Romania 28 Cyprus 27 Jordan 26 Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 Philippines 10 Indonesia 9 Turkey 9	Australia	58	
United States 51 O Latvia (LSS) 49 O Bulgaria 46 O International Average 46 England 45 O Thailand 45 O New Zealand 43 O Italy 37 Tunisia 34 V Morocco 31 V Moldova 31 V Israel 29 V Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 Philippines 10 Indonesia 9 Turkey 9	Hungary	55	
Latvia (LSS) 49 0 Bulgaria 46 0 International Average 46 England 45 0 Thailand 45 0 New Zealand 43 0 Italy 37 Tunisia 34 V Morocco 31 V Moldova 31 V Israel 29 V Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 V Philippines 10 Indonesia 9 V Turkey 9	Russian Federation	53	
Bulgaria         46         O           International Average         46           England         45         O           Thailand         45         O           New Zealand         43         O           Italy         37         ▼           Tunisia         34         ▼           Morocco         31         ▼           Moldova         31         ▼           Israel         29         ▼           Romania         28         ▼           Cyprus         27         ▼           Jordan         26         ▼           Macedonia, Rep. of         25         ▼           Chile         14         ▼           Iran, Islamic Rep.         10         ▼           Philippines         10         ▼           Indonesia         9         ▼           Turkey         9         ▼	United States	51	0
International Average 46  England 45 O Thailand 45 O New Zealand 43 O Italy 37 Tunisia 34 V Morocco 31 V Moldova 31 V Israel 29 V Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 V Philippines 10 Indonesia 9 V Turkey 9	Latvia (LSS)	49	0
England       45       O         Thailand       45       O         New Zealand       43       O         Italy       37       ▼         Tunisia       34       ▼         Morocco       31       ▼         Moldova       31       ▼         Israel       29       ▼         Romania       28       ▼         Cyprus       27       ▼         Jordan       26       ▼         Macedonia, Rep. of       25       ▼         Chile       14       ▼         Iran, Islamic Rep.       10       ▼         Philippines       10       ▼         Indonesia       9       ▼         Turkey       9       ▼	Bulgaria	46	0
Thailand 45 O New Zealand 43 O Italy 37 Tunisia 34 ▼ Morocco 31 ▼ Moldova 31 ▼ Israel 29 ▼ Romania 28 ▼ Cyprus 27 ▼ Jordan 26 ▼ Macedonia, Rep. of 25 ▼ Chile 14 ▼ Iran, Islamic Rep. 10 ▼ Philippines 10 ▼ Indonesia 9 ▼ Turkey 9			
New Zealand       43       ○         Italy       37       ▼         Tunisia       34       ▼         Morocco       31       ▼         Moldova       31       ▼         Israel       29       ▼         Romania       28       ▼         Cyprus       27       ▼         Jordan       26       ▼         Macedonia, Rep. of       25       ▼         Chile       14       ▼         Iran, Islamic Rep.       10       ▼         Philippines       10       ▼         Indonesia       9       ▼         Turkey       9       ▼			
New Zealand       43       O         Italy       37       V         Tunisia       34       V         Morocco       31       V         Israel       29       V         Romania       28       V         Cyprus       27       V         Jordan       26       V         Macedonia, Rep. of       25       V         Chile       14       V         Iran, Islamic Rep.       10       V         Philippines       10       V         Indonesia       9       V         South Africa       6       V	England	45	
Italy 37 Tunisia 34 Morocco 31 Moldova 31 Israel 29 Romania 28 Cyprus 27 Jordan 26 Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 Philippines 10 Indonesia 9 Turkey 9 South Africa 6	England Thailand	45 45	0
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Morocco 31 V Moldova 31 V Israel 29 V Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 V Chile 14 V Iran, Islamic Rep. 10 V Philippines 10 V Indonesia 9 V South Africa 6	England Thailand New Zealand Italy	45 45 43 37	0
Moldova 31 V Israel 29 V Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 V Chile 14 V Iran, Islamic Rep. 10 V Philippines 10 Indonesia 9 V South Africa 6	England Thailand New Zealand Italy Tunisia	45 45 43 37 34	0
Israel 29   Romania 28   Cyprus 27   Jordan 26   Macedonia, Rep. of 25   Chile 14   Iran, Islamic Rep. 10   Philippines 10   Indonesia 9   Turkey 9   South Africa 6	England Thailand New Zealand Italy Tunisia Morocco	45 45 43 37 34 31	0
Romania 28 V Cyprus 27 V Jordan 26 V Macedonia, Rep. of 25 V Chile 14 V Iran, Islamic Rep. 10 V Philippines 10 Indonesia 9 V Turkey 9 South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova	45 45 43 37 34 31	0
Cyprus 27 V  Jordan 26 V  Macedonia, Rep. of 25 V  Chile 14 V  Iran, Islamic Rep. 10 V  Philippines 10 Indonesia 9 V  Turkey 9 South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel	45 45 43 37 34 31 31 29	0
Jordan 26 W Macedonia, Rep. of 25 V Chile 14 V Iran, Islamic Rep. 10 V Philippines 10 Indonesia 9 V Turkey 9 South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania	45 45 43 37 34 31 31 29 28	0
Macedonia, Rep. of 25 Chile 14 Iran, Islamic Rep. 10 Philippines 10 Indonesia 9 Turkey 9 South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus	45 45 43 37 34 31 31 29 28 27	0
Chile 14 V Iran, Islamic Rep. 10 V Philippines 10 V Indonesia 9 V Turkey 9 V South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan	45 45 43 37 34 31 31 29 28 27 26	0
Iran, Islamic Rep.10▼Philippines10▼Indonesia9▼Turkey9▼South Africa6▼	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of	45 45 43 37 34 31 31 29 28 27 26 25	0
Philippines 10 V Indonesia 9 V Turkey 9 V South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile	45 45 43 37 34 31 31 29 28 27 26 25 14	0
Indonesia 9 ▼ Turkey 9 ▼ South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep.	45 45 43 37 34 31 31 29 28 27 26 25 14	0
Turkey 9 ▼ South Africa 6 ▼	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep. Philippines	45 45 43 37 34 31 31 29 28 27 26 25 14 10	0
South Africa 6	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep. Philippines Indonesia	45 45 43 37 34 31 31 29 28 27 26 25 14 10 10 9	0
	England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep. Philippines Indonesia Turkey	45 45 43 37 34 31 31 29 28 27 26 25 14 10 9 9	0

Country average vs. International average:

Higher Not different OLower

**Correct Response:** 

E

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

# Smallest simple fraction

Which of these fractions is smallest?

- A.  $\frac{1}{6}$
- B.  $\frac{2}{3}$
- C.  $\frac{1}{3}$
- D.  $\frac{1}{2}$

Item Number: D09

Correct Response:

Α

# **Overall Percent Correct**

Hong Kong, SAR Singapore Japan Netherlands Finland Chinese Taipei Canada Korea, Rep. of Belgium (Flemish) Australia United States Slovenia New Zealand Israel Cyprus England Hungary Slovak Republic Czech Republic Malaysia	93 90 89 87 85 85 83 82 80 76 75 75 73 71 67 65	
International Average Tunisia	61	0
Tunisia Latvia (LSS) Russian Federation	61 61 59	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan	61 61 59 59 51	0 0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania	61 61 59 59 51 50 47	0 0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania	61 61 59 59 51 50	0 0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of	61 61 59 59 51 50 47 46 44	0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

# Estimate of point P on number line



What is the best estimate of the number corresponding to P?

- A. 1.1
- B. 1.2
- C. 1.4
- D. 1.5

Item Number: D12

# **Overall Percent Correct**

Japan	93	<b>A</b>
Singapore	91	
Finland	90	
Netherlands	90	
England	88	
Hong Kong, SAR	86	
Belgium (Flemish)	84	
Canada	84	
Australia	83	
Chinese Taipei	81	
United States	81	
Korea, Rep. of	81	
Slovak Republic	80	
Hungary	80	
New Zealand	80	
Malaysia	78	
Slovenia	78	
Latvia (LSS)	78	
Russian Federation	77	
Italy	68	0
International Average	68	
Czech Republic	65	0

International Average	68	
Czech Republic	65	0
Israel	64	0
Thailand	64	0
Bulgaria	63	0
Moldova	63	$\blacksquare$
Lithuania	61	$\blacksquare$
Turkey	59	$\blacksquare$
Chile	54	$\blacksquare$
Romania	53	$\blacksquare$
Jordan	53	$\blacksquare$
Philippines	51	$\blacksquare$
Macedonia, Rep. of	49	$\blacksquare$
Indonesia	46	$\blacksquare$
Cyprus	44	$\blacksquare$
Morocco	43	$\blacksquare$
Tunisia	40	$\blacksquare$
South Africa	38	$\blacksquare$
Iran, Islamic Rep.	32	$\blacksquare$

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

# Average speed from distance and time

A runner ran 3000 m in exactly 8 minutes. What was his average speed in meters per second?
A. 3.75
B. 6.25
C. 16.0
D. 37.5
E. 62.5

Item Number: F07

# **Overall Percent Correct**

Singapore Chinese Taipei Hong Kong, SAR Japan Malaysia Russian Federation Belgium (Flemish) Korea, Rep. of Slovak Republic Bulgaria Slovenia Netherlands Hungary Lithuania	67 61 60 50 47 45 44 43 42 41 40 40 34	
International Averag	e 33	
Romania	33	0
Canada	32	O
Czech Republic	32	0
Turkey	30	O
Finland	30	0
Australia	29	0
Latvia (LSS)	29	0
Moldova	29	0
United States	28	
Thailand	28	
Indonesia	27	
Israel Tunisia	27 26	
Macedonia, Rep. of	26	Ž
New Zealand	25	¥
Italy	25	¥
Cyprus	23	•
England	22	•
Jordan	19	•
Iran, Islamic Rep.	19	************************************
Chile	17	<b>*</b>
Morocco	16	·
South Africa	16	▼
Philippines	15	▼

Country average vs. International average:

Higher A
Not different O
Lower 

Note of the second of the

**Correct Response:** 

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Number between two decimal fractions

Which of these numbers is between 0.07 and 0.08?
A. 0.00075
B. 0.0075
C. 0.075
D. 0.75

Item Number: F09

# **Overall Percent Correct**

Singapore Netherlands Korea, Rep. of Belgium (Flemish) Japan Chinese Taipei Hong Kong, SAR Finland Canada Australia Slovenia Slovak Republic England Lithuania Czech Republic Malaysia United States Hungary Russian Federation	87 85 84 84 83 82 81 80 78 76 75 74 71 70 70 69 69	
New Zealand	68	0
Bulgaria	67	0
Latvia (LSS) International Average	66 e <b>63</b>	0
Italy Italy	59	0
Israel	57	•
Macedonia, Rep. of	56	$\blacksquare$
Moldova	56	$\blacksquare$
Thailand	54	$\blacksquare$
Cyprus	53	•
Romania	52	
Tunisia	48	•
Chile	42	•
Indonesia	40	_
Morocco	39	* * * * * * * * * * * * * * * * * * *
Jordan	37	_
Turkey	35 34	<b>*</b>
Philippines South Africa	34 33	<b>*</b>
SOUTH ATRICA	<b>33</b>	▼

Country average vs. International average:

Iran, Islamic Rep.

Higher △
Not different ○
Lower ▼

**Correct Response:** 

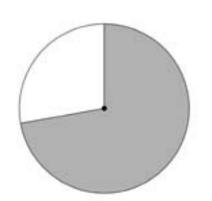
C

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

#### Fraction of circle shaded

What fraction of the circle is shaded?

- A. Between 0 and  $\frac{1}{4}$
- B. Between  $\frac{1}{4}$  and  $\frac{1}{2}$
- C. Between  $\frac{1}{2}$  and  $\frac{3}{4}$
- D. Between  $\frac{3}{4}$  and 1



Item Number: F12

#### **Overall Percent Correct**

	Netherlands	75	<b>A</b>
ı	Belgium (Flemish)	73	
ı	England	72	
ı	Hong Kong, SAR	72	
ı	Singapore	71	
ı	Canada	68	
ı	Australia	68	
ı	New Zealand	64	
ı	United States	62	
ı	Chinese Taipei	61	
ı	Japan	61	
ı	Slovenia	59	
ı	Finland	57	
ı	Hungary	56	
ı	Israel	54	O
ı	Bulgaria	53	0
ı	Czech Republic	51	O
ı	Malaysia	50	0
ı	Cyprus	50	0
	International Average	50	
I	Korea, Rep. of	50	0
ı	Russian Federation	50	O
ı	Slovak Republic	49	O
ı	Italy	48	O
ı	Latvia (LSS)	44	Ο
ı	Tunisia	43	
١	Jordan	40	<b>▼ ▼</b>
١	Romania	40	$\blacksquare$
1	Thailand	39	
J			

Country average vs. International average:

39

34

33

32

32

31 31

28

27

•

•

•

Indonesia

Moldova

Morocco

Philippines

South Africa

Lithuania

Turkey

Chile

Iran, Islamic Rep.

Macedonia, Rep. of

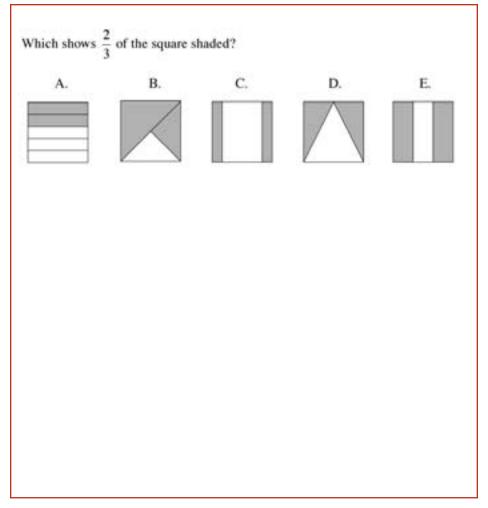
Higher △ Not different ○ Lower ▼

**Correct Response:** 

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

#### Figure showing fraction of shaded square



Item Number: H08

# **Overall Percent Correct**

Singapore	96	
Belgium (Flemish)	94	
Hong Kong, SAR	94	
Netherlands	92	
Canada	91	
Japan	89	
Chinese Taipei	88	
Finland	87	
Korea, Rep. of	87	
Cyprus	87	
United States	86	
Malaysia	86	
Australia	85	
England	82	
New Zealand	80	_
Hungary	78	_
Slovenia	78	<u> </u>
Iran, Islamic Rep.	76	<u> </u>
Israel	73	0
Slovak Republic	72	0
'		_
l hailand	71	()
Thailand	71 a 68	0
International Averag	e 68	
International Averag Latvia (LSS)	<b>e 68</b> 66	0
International Averag Latvia (LSS) Czech Republic	<b>e 68</b> 66 65	0
International Average Latvia (LSS) Czech Republic Italy	e 68 66 65 63	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation	e 68 66 65 63 61	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria	66 65 63 61 59	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile	66 65 63 61 59 57	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan	66 65 63 61 59 57 54	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey	66 65 63 61 59 57 54 53	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of	e 68 66 65 63 61 59 57 54 53 49	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia	66 65 63 61 59 57 54 53 49 48	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines	66 65 63 61 59 57 54 53 49 48 46	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania	66 65 63 61 59 57 54 53 49 48 46 45	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Phillippines Lithuania Moldova	66 65 63 61 59 57 54 53 49 48 46 45 43	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova Romania	66 65 63 61 59 57 54 53 49 48 46 45 43 41	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova Romania Indonesia	e 68 66 65 63 61 59 57 54 53 49 48 46 45 43 41 31	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova Romania Indonesia South Africa	e 68 66 65 63 61 59 57 54 53 49 48 46 45 43 41 31 21	0 0
International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova Romania Indonesia	e 68 66 65 63 61 59 57 54 53 49 48 46 45 43 41 31	0

Country average vs. International average:

Higher 
Not different 
Lower

**Correct Response:** 

Е

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Sum closest to 691 + 208

The sum 691 + 208 is closest to the sum
A. 600 + 200
B. 700 + 200
C. 700 + 300
D. 900 + 200

Item Number: H09

Correct Response:

В

# **Overall Percent Correct**

Singapore	97	
Belgium (Flemish)	96	
Japan	95	
Netherlands	95	
Hong Kong, SAR	93	
Canada	93	
United States	93	
Hungary	93	
Korea, Rep. of	93	
Slovenia	92	
England	92	
Czech Republic	91	
Australia	91	
Finland	91	
Slovak Republic	90	
Chinese Taipei	89	
New Zealand	88	
Malaysia	88	
Latvia (LSS)	87	
Bulgaria	86	
Cyprus	85	
Lithuania	84	O
Russian Federation	83	O
Israel	83	0
International Average	80	
	70	_

international Average	80	
Macedonia, Rep. of	79	0
Italy	77	0
Thailand	77	O
Turkey	74	$\blacksquare$
Romania	73	$\blacksquare$
Tunisia	67	$\blacksquare$
Jordan	66	$\blacksquare$
Moldova	66	$\blacksquare$
Chile	65	$\blacksquare$
Iran, Islamic Rep.	58	$\blacksquare$
Indonesia	54	$\blacksquare$
Philippines	53	$\blacksquare$
Morocco	43	$\blacksquare$
South Africa	37	$\blacksquare$

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

#### Division of fractions

D1	6		3	
Divide:		÷		=
	55		25	

Answer: _	
-----------	--

Item Number: J12

#### **SCORING**

#### **Correct Response**

- 10/11
- Other fractions or decimals equivalent to 10/11 (e.g., 30/33, 150/165, .909, .91, etc.)

#### **Incorrect Response**

- Any fraction with 2 as a numerator [Divides 6 by 3]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

# **Overall Percent Correct**

Singapore	84	
Chinese Taipei	83	
Hong Kong, SAR	81	<u> </u>
Korea, Rep. of	80	<u> </u>
Japan	79	_
Slovenia	74	_
Russian Federation	72	<b>A</b>
Bulgaria	72	
Slovak Republic	71	
Latvia (LSS)	68	<b>A A A</b>
Hungary	66	
Romania	65	
Lithuania	64	
Italy	63	
Belgium (Flemish)	58	
Moldova	57	
Czech Republic	56	0
Malaysia	54	▲ ▲ ▲ ○
International Averag	e 45	
Turkey	41	0
,		0
Thailand	40	0
Thailand United States	40 37	○ ▼
Thailand United States Iran, Islamic Rep.	40 37 34	○ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada	40 37 34 32	○ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada Jordan	40 37 34 32 32	○ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia	40 37 34 32 32 29	○ ▼ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile	40 37 34 32 32 29 26	○ ▼ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia	40 37 34 32 32 29 26 24	0 V V V
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of	40 37 34 32 32 29 26 24 24	0 V V V
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia	40 37 34 32 32 29 26 24 24 23	0 V V V V
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel	40 37 34 32 32 29 26 24 24 23 22	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li><!--</td--></li></ul>
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus	40 37 34 32 32 29 26 24 24 23 22 21	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li><!--</td--></li></ul>
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland	40 37 34 32 32 29 26 24 24 23 22 21	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands	40 37 34 32 32 29 26 24 24 23 22 21 17	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines	40 37 34 32 32 29 26 24 24 23 22 21 17 12	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines New Zealand	40 37 34 32 32 29 26 24 24 23 22 21 17 12 11	• •
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines New Zealand South Africa	40 37 34 32 32 29 26 24 24 23 22 21 17 12 11 10 5	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li><!--</td--></li></ul>
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines New Zealand	40 37 34 32 32 29 26 24 24 23 22 21 17 12 11	

# Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

#### Division of decimals

Divide 0.003)15.45
A. 0.515
B. 5.15
C. 51.5
D. 515
E. 5150

Item Number: J14

Correct Response: E

# Overall Percent Correct

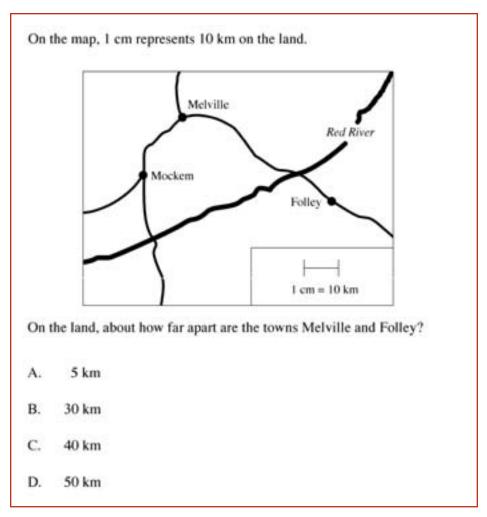
lanan	70	
Japan Slovak Republic	70 69	<b>A</b>
Russian Federation	68	<b>A</b>
Hong Kong, SAR	66	A A A A A A
Lithuania	65	_
Chinese Taipei	64	
Hungary	63	
Korea, Rep. of	61	_
Latvia (LSS)	54	
Slovenia	54	
Moldova	53	_
Bulgaria	53	
Czech Republic	52	<b>A</b>
Belgium (Flemish)	45	0
Singapore	45	0
Netherlands	43	0
Romania	40	0
International Average		0
United States	39	0
Canada	39	0
Malaysia	39	0
Macedonia, Rep. of	38	0
Italy	36	
Jordan	30	_
Finland	29	<b>*</b>
Cyprus	26	<b>.</b>
Indonesia	24	V
Israel	24	<b>*</b>
Thailand	23	<b>.</b>
New Zealand	21	V
Tunisia	21	<b>*</b>
Philippines	20	<b>.</b>
Australia	20	V
South Africa	19	<b>*</b>
Chile	18	Ť
England	16	O V
Turkey	15	<b>*</b>
Iran, Islamic Rep.	14	<b>*</b>
Morocco	14	<b>*</b>
IVIOIOCCO	17	*

Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Distance between towns from map



Item Number: J18

#### **Overall Percent Correct**

Japan	85	
Belgium (Flemish)	83	
Singapore	82	
Malaysia	77	
Lithuania	75	
Chinese Taipei	70	
Slovenia	70	
Netherlands	70	
Latvia (LSS)	68	
Russian Federation	68	
Czech Republic	67	0
Canada	65	
Hungary	65	0
Moldova	64	O
Bulgaria	64	O
Australia	64	0
Italy	63	0
England	62	O
Finland	61	O
Cyprus	61	0
Slovak Republic	61	O
Korea, Rep. of	60	0
New Zealand	58	0
International Averag	e 57	
Thailand	56	0
Tunisia	54	0
Romania	51	0
Jordan	46	$\blacksquare$
Indonesia	44	•
Israel	44	•
Macedonia, Rep. of	43	•
United States	40	•
Iran, Islamic Rep.	37	* * * * * * * * * * * * * * * * * * *
Turkey	35	$\blacksquare$
Chile	30	$\blacksquare$
South Africa	26	$\blacksquare$
Morocco	25	$\blacksquare$
Philippines	24	•

Country average vs. International average:

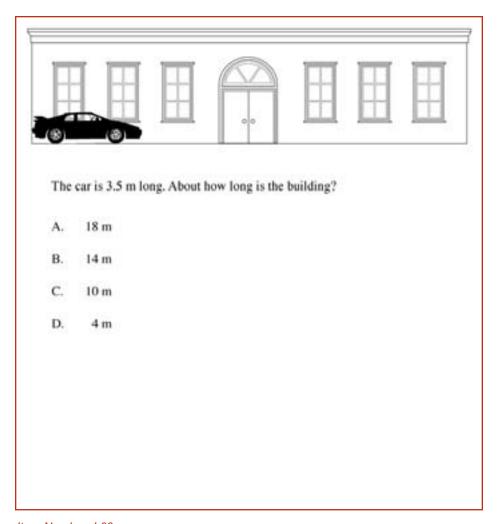
Higher
Not different
Lower

**Correct Response:** 

D

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

# Length of building compared to car



Item Number: L09

# **Overall Percent Correct**

Singapore	91	<b>A</b>
Malaysia	90	
Czech Republic	89	<b>A</b>
Slovak Republic	88	<b>A</b>
Hungary	88	<b>A</b>
Russian Federation	88	<b>A</b>
Finland	87	<b>A</b>
Chinese Taipei	87	<b>A</b>
Korea, Rep. of	87	<b>A</b>
Lithuania	87	<b>A</b>
Latvia (LSS)	86	<b>A</b>
Belgium (Flemish)	85	<b>A</b>
Japan	84	<b>A</b>
Hong Kong, SAR	83	<b>A</b>
Australia	83	<b>A</b>
Bulgaria	83	<b>A</b>
Netherlands	82	<b>A</b>
Slovenia	82	0
Canada	79	0
New Zealand	78	0
England	76	0
Romania	76	0
Moldova	75	0
International Average		
Thailand	73	0
Italy	73	0
United States	72	0
Cyprus	71	0
Tunisia	70	0
Macedonia, Rep. of	69	0
Turkey	68	▼
Israel	68	▼
Iran, Islamic Rep.	61	▼
Chile	60	▼
Indonesia	59	▼
Jordan	56	▼
Morocco	43	▼
Philippines	40	* * * * * * * *
C L	20	_
South Africa	26	•

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

#### Two hundred six and nine-tenths

Which number is two hundred six and nine-tenths?
A. 206.09
B. 206.9
C. 206.910
D. 2006.9

Item Number: L10

# **Overall Percent Correct**

Hungary	97	<b>A</b>
Russian Federation	93	<u> </u>
Slovak Republic	90	<u> </u>
Belgium (Flemish)	87	
Iran, Islamic Rep.	83	
Moldova	81	<u> </u>
United States	80	<b>A</b>
Netherlands	79	<u> </u>
Korea, Rep. of	78	<u> </u>
Canada	77	_
Czech Republic	75	▲ ▲
Jordan	75	<u> </u>
Lithuania	73	0
Turkey	72	<b>A</b>
Singapore	72	0
Chinese Taipei	72	<b>A</b>
Bulgaria	71	0
Romania	71	0
Finland	70	0
Hong Kong, SAR	68	0
Australia	67	0
Italy	66	0
International Average	e 65	
Israel	62	0
Japan	62	0
Slovenia	61	0
Chile	60	0
Malaysia	56	<b>V</b>
Latvia (LSS)	55	
Cyprus	54	<b>V</b>
England	53	<b>V</b>
New Zealand	53	•
Tunisia	43	<b>V</b>
Macedonia, Rep. of	42	•
Philippines	42	•
(- (- · · · · · · · ·		
Morocco	41	
Morocco Thailand	41 40	<b>▼</b>
		0 V V V V
Thailand	40	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

#### Subtraction with three fractions

What is the value of  $\frac{4}{5}$  -  $\frac{1}{3}$  -  $\frac{1}{15}$  ?

- A.  $\frac{1}{5}$
- B.  $\frac{2}{5}$
- C.  $\frac{7}{15}$
- D.  $\frac{3}{4}$
- E.  $\frac{4}{5}$

Item Number: L18

# **Overall Percent Correct**

Singapore	87		
Chinese Taipei	81		
Korea, Rep. of	81		
Belgium (Flemish)	78		
Hong Kong, SAR	77		
Japan	75		
Malaysia	71		
Russian Federation	64		
Slovenia	63		
Slovak Republic	62	0	
Hungary	60	0	
Lithuania	58	0	
Canada	57	0	
Czech Republic	55	0	
Netherlands	55	0	
United States	55	0	
International Average 52			

International Average	52	
Indonesia	51	0
Finland	51	0
Thailand	51	0
Latvia (LSS)	50	0
Romania	50	0
Bulgaria	48	0
Australia	48	0
Cyprus	47	0
Israel	44	$\blacksquare$
Turkey	44	•
Moldova	43	0
Italy	43	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
New Zealand	41	$\blacksquare$
Jordan	40	$\blacksquare$
Macedonia, Rep. of	37	
Iran, Islamic Rep.	36	<b>V</b>
Tunisia	36	$\blacksquare$
Philippines	35	$\blacksquare$
England	34	<b>V</b>
Chile	32	$\blacksquare$
South Africa	23	$\blacksquare$
Morocco	16	•

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

#### Number of cars from rounded value

A company produced 17,175 cars in 1996. For a report, this number was rounded to the nearest hundred. Which was the number of cars given in the report?

A. 17,000

B. 17,100

C. 17,200

D. 17,270

Item Number: N11

Correct Response:

C

#### **Overall Percent Correct**

Singapore	96	
Czech Republic	96	
Finland	94	
Slovenia	94	
Australia	94	<b>A A A</b>
Belgium (Flemish)	93	
Hungary	93	
Slovak Republic	92	
Canada	92	
Netherlands	90	
United States	89	
Malaysia	89	
England	87	
New Zealand	86	
Bulgaria	86	
Hong Kong, SAR	86	<b>A</b>
Chinese Taipei	82	
Korea, Rep. of	82	
Russian Federation	81	
Latvia (LSS)	80	0
Japan	79	
Lithuania	76	0
International Average	74	
Romania	72	0
Italy	72	0
Israel	72	0
Thailand	68	0
Macedonia, Rep. of	65	$\blacksquare$
Cyprus	64	$\blacksquare$
Indonesia	61	$\blacksquare$
Turkey	59	•
Chile	58	$\blacksquare$
Jordan	55	* * * * * * * * * * * * * * * * * * *
Philippines	51	$\blacksquare$

Country average vs. International average:

49 38

30

30

Moldova

Morocco

South Africa Tunisia

Iran, Islamic Rep.

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

#### List of equivalent fractions

In which list of fractions are all of the fractions equivalent?

A. 
$$\frac{1}{2}$$
 ,  $\frac{2}{4}$  ,  $\frac{4}{6}$ 

B. 
$$\frac{2}{3}$$
 ,  $\frac{4}{6}$  ,  $\frac{8}{12}$ 

C. 
$$\frac{2}{5}$$
 ,  $\frac{4}{10}$  ,  $\frac{8}{50}$ 

D. 
$$\frac{3}{4}$$
 ,  $\frac{4}{6}$  ,  $\frac{6}{8}$ 

Item Number: N14

**Correct Response:** 

В

# **Overall Percent Correct**

Korea, Rep. of	86	
Chinese Taipei	85	
Hong Kong, SAR	84	
Singapore	84	
Belgium (Flemish)	83	
Japan	82	
Netherlands	74	
Canada	72	
Russian Federation	71	
Hungary	70	0
Bulgaria	68	0
Malaysia	68	0
Slovak Republic	67	0
Latvia (LSS)	66	0
Lithuania	66	0
Slovenia	65	0
Cyprus	64	0
United States	63	0
Australia	63	0
Finland	61	O
International Averag	e 61	

ı			
	International Average	61	
	Czech Republic	60	0
	Israel	59	O
	Italy	57	O
	Thailand	57	O
	Jordan	55	O
	Romania	55	O
	New Zealand	51	$\blacksquare$
	England	51	$\blacksquare$
	Moldova	50	$\blacksquare$
	Iran, Islamic Rep.	49	$\blacksquare$
	Tunisia	49	$\blacksquare$
	Indonesia	48	$\blacksquare$
	Turkey	45	$\blacksquare$
	Macedonia, Rep. of	44	$\blacksquare$
	Philippines	42	$\blacksquare$
	Chile	41	$\blacksquare$
	South Africa	34	$\blacksquare$
	Morocco	32	$\blacksquare$
ı			

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Number of marbles in bag

Penny had a bag of marbles. She gave one-third of them to Rebecca, and then one-fourth of the remaining marbles to John. Penny then had 24 marbles left in the bag. How many marbles were in the bag to start with?

A. 36

B. 48

C. 60

D. 96

Item Number: N16

Correct Response:

В

#### **Overall Percent Correct**

Singapore	81	<b>A</b>
Japan	64	
Korea, Rep. of	64	<b>A</b>
Chinese Taipei	60	<b>A</b>
Hong Kong, SAR	60	<b>A</b>
Netherlands	53	Ο
Finland	53	Ο
Belgium (Flemish)	52	Ο
New Zealand	49	0
Australia	48	0
Malaysia	47	0
England	46	0
Slovak Republic	45	0
Thailand	45	Ο
Canada	45	0
Hungary	45	0
Czech Republic	44	0
International Average	44	
Philippines	43	0
Bulgaria	43	0
Russian Federation	42	0
Israel	42	0
Moldova	41	0
Latvia (LSS)	41	0
United States	41	0
Slovenia	39	Ο
Romania	38	Ο
Turkey	38	0
Italy	38	0
Indonesia	37	0
Cyprus	36	0
Macedonia, Rep. of	35	•
Morocco	34	•
Jordan	33	•
Tunisia	33	•
	-	
Lithuania	32	•
South Africa		<b>▼</b>
	32	<b>* *</b>
South Africa	32 31	<b>* * * * * *</b>

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Amount of paint left

A painter had 25 L of paint. He used 2.5 L of paint every hour. He finished the job in 5.5 hours. How much paint did he have left?

A. 10.25 L

B. 11.25 L

C. 12.75 L

D. 13.75 L

Item Number: N17

# **Overall Percent Correct**

Singapore Chinese Taipei Hong Kong, SAR Malaysia Korea, Rep. of Netherlands Japan Czech Republic Hungary	65 63 56 54 53 49 47 43	<b>A A A O O</b>
Bulgaria	39	0
Russian Federation Lithuania	39 39	0
Belgium (Flemish)	39	0
Slovak Republic	39	0
Canada	36	0
Slovenia	36	0
International Averag		
United States Finland	35 34	0
Cyprus	33	O
Australia	32	O
Latvia (LSS)	31	Ο
Turkey	29	0
Romania	29	0
Moldova	29	0
New Zealand	29	0
Macedonia, Rep. of	28 27	0
Italy England	27 27	0
Tunisia	26	
Israel	25	<b>*</b>
Iran, Islamic Rep.	25	<b>*</b>
Morocco	23	* * * * * * * * * * * * * * * * * * *
Indonesia	22	<b>V</b>
Chile	22	•
Jordan	21	$\blacksquare$
Philippines	20	$\blacksquare$
South Africa	18	•

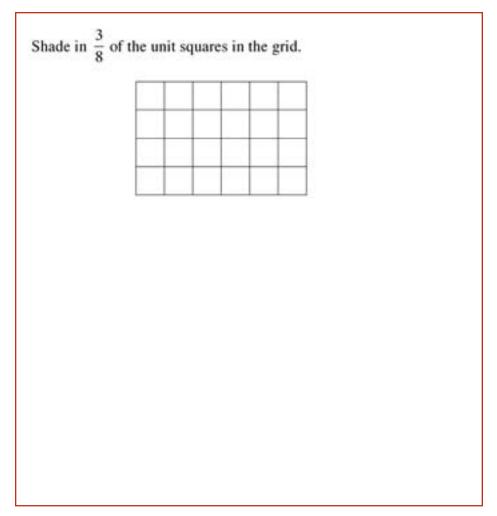
Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

#### Shade in 3/8 of squares in grid



#### Item Number: N19

#### **SCORING**

#### **Correct Response**

- 9 squares are shaded (regardless of which squares)
- Other correct (e.g., 6 full squares and 6 half squares shaded or other equivalent of nine squares)

#### Incorrect Response

- 3 squares shaded
- 8 squares shaded
- 11 or 13 squares shaded
- 3 squares shaded and 8 more squares shaded (areas are shaded separately)
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

#### **Overall Percent Correct**

Singapore		
	89	
Hong Kong, SAR	87	
Belgium (Flemish)	87	
Korea, Rep. of	81	
Chinese Taipei	80	
Japan	78	
Malaysia	73	
Canada	68	<b>A</b>
Finland	65	
Hungary	63	
Netherlands	61	0
Australia	60	
Slovenia	55	0
Bulgaria	54	0
Cyprus	54	0
England	52	0
Slovak Republic	52	0
Russian Federation	52	0
United States	49	0
International Averag	e 49	
-1 1 1	40	
Thailand	49	0
New Zealand	49 46	0
New Zealand	46	0
New Zealand Italy	46 46	0
New Zealand Italy Latvia (LSS)	46 46 46	0 0
New Zealand Italy Latvia (LSS) Moldova	46 46 46 44	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic	46 46 46 44 42	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel	46 46 46 44 42 40	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania	46 46 46 44 42 40 39	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of	46 46 46 44 42 40 39 32	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan	46 46 46 44 42 40 39 32 31	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep.	46 46 44 42 40 39 32 31 31	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia	46 46 44 42 40 39 32 31 31 28	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey	46 46 44 42 40 39 32 31 31 28 26	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania	46 46 44 42 40 39 32 31 31 28 26 26	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania Indonesia	46 46 44 42 40 39 32 31 31 28 26 26 21	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania Indonesia Chile	46 46 44 42 40 39 32 31 31 28 26 26 21	0 0 0

# Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Estimate of total cars in parking lot

There are 68 rows of cars in a parking lot. Each row has 92 cars. Which of these would give the closest estimate of the total number of cars in the parking lot?

A.  $60 \times 90 = 5400$ 

B.  $60 \times 100 = 6000$ 

 $C.70 \times 90 = 6300$ 

D.  $70 \times 100 = 7000$ 

Item Number: P13

Correct Response:

C

#### **Overall Percent Correct**

Singapore	94	<b>A</b>
Hong Kong, SAR	85	
Belgium (Flemish)	83	
Japan	82	
Korea, Rep. of	82	
Chinese Taipei	81	
Netherlands	81	
Finland	79	<b>A</b>
United States	79	
Slovak Republic	78	<b>A</b>
Hungary	78	
Canada	78	
Czech Republic	78	
Malaysia	78	<b>A</b>
Australia	77	
Slovenia	76	
England	74	
New Zealand	67	0
Russian Federation	65	0
International Average	65	
Israel	63	0
Israel Latvia (LSS)	63 62	0
		0
Latvia (LSS) Cyprus Bulgaria	62 60 60	0 0
Latvia (LSS) Cyprus Bulgaria Thailand	62 60 60 58	0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan	62 60 60 58 58	0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand	62 60 60 58 58 57	0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan	62 60 60 58 58 57 55	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania	62 60 60 58 58 57	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania	62 60 60 58 58 57 55	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of	62 60 60 58 58 57 55 53 52 52	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey	62 60 60 58 58 57 55 53 52	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova	62 60 60 58 58 57 55 53 52 52	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey	62 60 60 58 58 57 55 53 52 52	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey Chile Tunisia Iran, Islamic Rep.	62 60 60 58 58 57 55 53 52 52 50 48	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey Chile Tunisia	62 60 60 58 58 57 55 53 52 52 50 48 48 48	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey Chile Tunisia Iran, Islamic Rep.	62 60 60 58 58 57 55 53 52 52 50 48 48	0 0 0 0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey Chile Tunisia Iran, Islamic Rep.	62 60 60 58 58 57 55 53 52 52 50 48 48 48	0 0 0 0 0 0
Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey Chile Tunisia Iran, Islamic Rep. Indonesia Philippines	62 60 60 58 58 57 55 53 52 52 50 48 48 44 44	0 0 0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Estimate of distance from explosion

Sound travels at approximately 330 meters per second. The sound of an explosion took 28 seconds to reach a person. Which of these is the closest estimate of how far away the person was from the explosion?

A. 12,000 m

B. 9,000 m

C. 8,000 m

D. 6,000 m

Item Number: P14

Correct Response:

В

#### **Overall Percent Correct**

Singapore	83	<b>A</b>
Japan	81	
Korea, Rep. of	78	
Hong Kong, SAR	78	
Chinese Taipei	77	
Slovak Republic	76	
Slovenia	71	
Czech Republic	71	
Malaysia	70	
Belgium (Flemish)	69	
Canada	64	
Netherlands	63	0
Finland	63	0
United States	63	
Australia	62	0
Lithuania	62	0
Hungary	61	0
Russian Federation	59	0
Thailand	59	0
International Average	e <b>56</b>	
Bulgaria	55	0
Bulgaria Italy	55 52	0
9		0
Italy Latvia (LSS) Israel	52 52 51	0 0
Italy Latvia (LSS) Israel Turkey	52 52 51 50	0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus	52 52 51 50 50	0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand	52 52 51 50 50	0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus	52 52 51 50 50	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand	52 52 51 50 50	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England	52 52 51 50 50 50 50 47 45	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of	52 52 51 50 50 50 50 47	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan	52 52 51 50 50 50 50 47 45 43 42	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines	52 52 51 50 50 50 50 47 45 43	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan	52 52 51 50 50 50 50 47 45 43 42	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania	52 52 51 50 50 50 50 47 45 43 42 42	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania Iran, Islamic Rep.	52 52 51 50 50 50 47 45 43 42 42 41 40 38	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania Iran, Islamic Rep. Chile	52 52 51 50 50 50 47 45 43 42 42 41 40	0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania Iran, Islamic Rep.	52 52 51 50 50 50 47 45 43 42 42 41 40 38	0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania Iran, Islamic Rep. Chile	52 52 51 50 50 50 47 45 43 42 42 41 40 38 37	0 0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Fraction of cherries in basket

Robin and Jim took cherries from a basket. Robin took  $\frac{1}{3}$  of the cherries and Jim took  $\frac{1}{6}$  of the cherries. What fraction of the cherries remained in the basket?

- A.  $\frac{1}{2}$
- B.  $\frac{1}{3}$
- C.  $\frac{1}{6}$
- D.  $\frac{1}{18}$

Item Number: P15

# Correct Response:

Α

# **Overall Percent Correct**

Hong Kong, SAR Chinese Taipei Belgium (Flemish) Japan Netherlands Cyprus Malaysia Korea, Rep. of Hungary Canada United States Russian Federation Australia Slovenia Latvia (LSS) Finland Slovak Republic Romania Lithuania	75 68 62 62 61 56 55 55 53 52 51 51 49 48 48 47 46	
Moldova	44	0
	13	0
Czech Republic Israel	43 43	0
Czech Republic		_
Czech Republic Israel	43	0 0
Czech Republic Israel New Zealand	43 43	0 0 0
Czech Republic Israel New Zealand Bulgaria	43 43 43 42 38	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan	43 43 43 42 38 34	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia	43 43 43 42 38 34 34	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy	43 43 43 42 38 34 34 34	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep.	43 43 43 42 38 34 34 32 32	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey	43 43 43 42 38 34 34 32 32 32	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia	43 43 43 42 38 34 34 32 32 32 31	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia Thailand	43 43 42 38 34 34 32 32 32 31 29	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia Thailand Philippines	43 43 42 38 34 34 32 32 32 31 29 22	0 0 0 0 0
Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia Thailand	43 43 42 38 34 34 32 32 32 31 29	0 0 0

# Country average vs. International average:

Higher Not different Lower

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

#### Write decimal as fraction

Write 0.48 as a fraction reduced to its lowest terms.
Answer:

Item Number: P17

#### **SCORING**

#### **Correct Response**

• 12/25

#### **Incorrect Response**

- 48/100 OR 24/50
- Any fraction other than 48/100 with 48 as numerator
- Any fraction with 48 as denominator
- 4/8 OR 2/4 OR 1/2
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

# **Overall Percent Correct**

Singapore Korea, Rep. of Hong Kong, SAR Chinese Taipei Japan Belgium (Flemish) Moldova Canada Slovenia United States Iran, Islamic Rep. Bulgaria Australia Slovak Republic Russian Federation Romania Malaysia Hungary International Average	87 78 74 71 65 56 55 50 48 46 43 42 42 42 41 40 40	
Tunisia	34	0
Netherlands Czech Republic	31 30	0
Latvia (LSS)	28	0
Italy	25	
Israel	24	<b>V</b>
Turkey	24	•
Thailand	24	<b>V</b>
Thailand Lithuania	24 24	<b>V</b>
		<b>*</b>
Lithuania	24	▼ ▼ ▼
Lithuania New Zealand	24 23	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus	24 23 22	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus Jordan	24 23 22 22	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus Jordan Indonesia Finland England	24 23 22 22 22	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus Jordan Indonesia Finland	24 23 22 22 22 19	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus Jordan Indonesia Finland England	24 23 22 22 22 19 18	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus Jordan Indonesia Finland England Macedonia, Rep. of	24 23 22 22 22 19 18	* * * * * * * * * * * * * * * * * * *
Lithuania New Zealand Cyprus Jordan Indonesia Finland England Macedonia, Rep. of Philippines	24 23 22 22 22 19 18 13	* *

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

#### Subtraction of decimals to 0.001

Subtract: 4.722 – 1.935 =
A. 2.787
B. 2.797
C. 2.887
D. 2.897

Item Number: R07

# **Overall Percent Correct**

92	
90	
90	<b>A</b>
90	
88	<b>A</b>
88	
87	
86	
86	
85	0
84	<ul><li>○</li><li>▲</li><li>▲</li></ul>
83	
83	
82	0
81	0
80	0
80	0
79	0
78	0
77	0
77	O
77	U
77	0
	_
77 <b>e 77</b> 75	0
77 e <b>77</b>	0 0
77 1e 77 75 74 73	0 0 0 0
77 e 77 75 74	0 0 0 0 0
77 1e 77 75 74 73	0 0 0 0 0 0
77 e 77 75 74 73 72	0 0 0 0 0 0 0
77 e 77 75 74 73 72 71	0 0 0 0 0 0 0 0 0
77  e 77  75  74  73  72  71  71  71	0 0 0 0 0 0 0 0 0 0
77  e 77  75  74  73  72  71  71  71  69	0 0 0 0 0 0 0 0 0 0
77  e 77  75  74  73  72  71  71  71  69  69	0 0 0 0 0 0 0 0 0 0
77  e 77  75  74  73  72  71  71  71  69	0 0 0 0 0 0 0 0
	90 90 90 88 88 87 86 86 85 84 83 83 82 81 80 79 78

Country average vs. International average:

Morocco New Zealand

England

South Africa

62

61

59

Higher
Not different
Lower

**Correct Response:** 

A

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Average weight of salt crystals

The total weight of a pile of 500 salt crystals is 6.5 g. What is the average weight of a salt crystal?

A. 0.0078 g

B. 0.013 g

 $C.\ 0.0325 \ g$ 

D. 0.078 g

Item Number: R08

**Correct Response:** 

В

# **Overall Percent Correct**

Hong Kong, SAR Chinese Taipei Singapore Japan Korea, Rep. of Hungary Slovak Republic Russian Federation Malaysia Belgium (Flemish) Lithuania Slovenia Netherlands Bulgaria Moldova Finland	75 75 74 73 72 67 66 65 64 63 57 57 57 55 54	
International Averag	e 52	
Romania Czech Republic Chile Canada Tunisia Turkey Latvia (LSS) Macedonia, Rep. of Australia Indonesia Italy Thailand United States New Zealand Jordan England Israel Iran, Islamic Rep. Morocco South Africa Cyprus Philippines	52 50 49 48 48 47 47 47 46 45 44 43 41 40 40 36 35 35 31 29	

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

# Subtraction of 4-digit whole numbers

Subtract:	7003 - <u>4078</u>		
A. 2035			
B. 2925 C. 3005			
D. 3925			

Item Number: R13

**Correct Response:** 

В

# **Overall Percent Correct**

Malaysia	94	<b>A</b>
Singapore	92	
Chinese Taipei	90	
Hong Kong, SAR	90	
Korea, Rep. of	88	
Hungary	87	
Slovak Republic	86	
Japan	86	
Belgium (Flemish)	85	
Slovenia	83	
Canada	83	
Czech Republic	82	0
United States	81	
Lithuania	80	0
Tunisia	80	
Russian Federation	79	0
Moldova	79	0
Netherlands	79	0
Australia	77	0
Thailand	77	0
Finland	76	0
Bulgaria	76	0
International Averag	e 74	
Latvia (LSS)	74	0
Iran, Islamic Rep.	73	0
Cyprus	70	0
Turkey	69	0
Jordan	69	0
Romania	68	0
Israel	67	0
Italy	67	0
Macedonia, Rep. of	65	$\blacksquare$
Chile	59	$\blacksquare$
Philippines	58	$\blacksquare$
New Zealand	58	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li><!--</td--></li></ul>
Indonesia	55	$\blacksquare$
Morocco	54	$\blacksquare$
England	51	$\blacksquare$
I a second		
South Africa	37	$\blacksquare$

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### How much money left if spent 5/8

Laura had \$240. She spent $\frac{5}{8}$ of it. How much money did she have left?
Answer:

Item Number: R14

#### **SCORING**

 $\textbf{Note:} \ \ \textbf{There is no distinction made between responses with and without units.}$ 

#### **Correct Response**

• 90

#### **Incorrect Response**

- 150 [money spent]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

# **Overall Percent Correct**

Moldova 38 ( Australia 37 ( Slovenia 35 ( Slovak Republic 33 ( Cyprus 33 ( Canada 30 (	
International Average 30	
Bulgaria 27 (	)
	)
51.1104 514105	7
Italy 24 (	)
	)
3	)
Latvia (LSS) 24 (	
Israel 23 (	)
Tunisia 22	7
Romania 21	7
Thailand 21	7
Iran, Islamic Rep. 20	7
Lithuania 19	7
Turkey 17	7
Macedonia, Rep. of 14	7
Israel 23 Tunisia 22 Romania 21 Thailand 21 Iran, Islamic Rep. 20 Lithuania 19 Turkey 17 Macedonia, Rep. of 14 Jordan 14 Indonesia 11 Chile 6 Philippines 4 South Africa 3	7
Indonesia 11	7
Chile 6	7
Philippines 4	7
South Africa 3	7
Morocco 1	7

# Country average vs. International average:

Higher A
Not different O
Lower V

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Money from total magazine sales

John sold 60 magazines and Mark sold 80 magazines. The magazines were all sold for the same price. The total amount of money received for the magazines was \$700. How much money did Mark receive?
Answer:

Item Number: R15

#### **SCORING**

Note: There is no distinction made between responses with and without units.

#### **Correct Response**

• 400

#### **Incorrect Response**

- 500 [price per magazine x 100]
- 350 [700 ÷ 2]
- 300 [money John received]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

# **Overall Percent Correct**

Singapore	84	<b>A</b>
Chinese Taipei	75	<u> </u>
Hong Kong, SAR	72	
Korea, Rep. of	69	
Japan	67	
Malaysia	65	
Slovenia	60	
Belgium (Flemish)	60	
Hungary	58	
Moldova	54	<b>A A A A</b>
Czech Republic	54	0
Slovak Republic	54	0
Lithuania .	54	
Netherlands	53	0
Russian Federation	52	0
Bulgaria	50	0
Latvia (LSS)	48	0
Finland	47	0
Canada	46	0
International Average	e 44	
Australia	44	0
		0
Australia	44	0
Australia Romania	44 43	0 0
Australia Romania United States	44 43 41	0 0 0
Australia Romania United States Cyprus	44 43 41 40	0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy	44 43 41 40 39	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand	44 43 41 40 39 38	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy	44 43 41 40 39 38 36	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand	44 43 41 40 39 38 36 33	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England	44 43 41 40 39 38 36 33 31	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel	44 43 41 40 39 38 36 33 31 30	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia	44 43 41 40 39 38 36 33 31 30 30	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep.	44 43 41 40 39 38 36 33 31 30 30 28	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan	44 43 41 40 39 38 36 33 31 30 30 28 27	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey	44 43 41 40 39 38 36 33 31 30 30 28 27 26 23 22	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan	44 43 41 40 39 38 36 33 31 30 30 28 27 26 23	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan Chile	44 43 41 40 39 38 36 33 31 30 28 27 26 23 22 12 9	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan Chile Philippines	44 43 41 40 39 38 36 33 31 30 28 27 26 23 22 12	0 0 0 0 0

# Country average vs. International average:

Higher A
Not different Cower

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Number/fraction of 2 types of boxes

Item Number: T02A

#### **SCORING**

A: Scoring for Total Number of Boxes

#### **Correct Response**

• 7

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task)

#### **Overall Percent Correct**

Singapore	62	<b>A</b>
Chinese Taipei	60	
Korea, Rep. of	59	▲ ▲ 0 4
Japan	58	
Hong Kong, SAR	58	
Belgium (Flemish)	43	
Bulgaria	33	0
Malaysia	33	
Finland	32	0
Australia	32	
Netherlands	32	0
Hungary	31	
Canada	31	<ul><li>○</li><li>▲</li></ul>
Slovenia	31	0
Latvia (LSS)	29	0
Russian Federation	29	0
United States	26	0
International Average	e <b>26</b>	
Slovak Republic	25	0
England	24	0
Moldova	24	0
New Zealand	24	0
Romania	22	0
Czech Republic	22	0
Lithuania	22	0
Thailand	19	$\blacksquare$
Israel	18	$\blacksquare$
Italy	18	$\blacksquare$
Cyprus	15	$\blacksquare$
Jordan	12	$\blacksquare$
Indonesia	10	$\blacksquare$
Turkey	9	$\blacksquare$
Tunisia	8	$\blacksquare$
Macedonia, Rep. of	8	$\blacksquare$
Iran, Islamic Rep.	7	$\blacksquare$
Chile	4	$\blacksquare$
Philippines	2	$\blacksquare$
South Africa	2	O V
Morocco	1	$\blacksquare$

# Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Number/fraction of 2 types of boxes

Item Number: T02B

#### **SCORING**

B: Scoring for Fraction of Books in Smaller Boxes

Note: The term "equivalent" in the scoring guide below includes decimal fractions and percentages.

#### **Correct Response**

- 2/5
- Another fraction or percent equivalent to 2/5 (e.g., 8/20, 14/35, 28/70, etc.)
- Other correct

#### **Incorrect Response**

- 1/2
- 2/3 OR 8/12 OR 56/84 [fraction of boxes]
- Any integer
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

#### **Overall Percent Correct**

Singapore	48	<b>A</b>
Hong Kong, SAR	43	
Chinese Taipei	43	
Japan	32	
Korea, Rep. of	30	
Bulgaria	18	0
Malaysia	16	0
Russian Federation	15	0
Canada	14	0
Netherlands	13	0
Hungary	13	0
Australia	12	0
International Averag	je 12	
Slovenia	11	0
United States	11	0
Slovak Republic	11	0
Romania	10	0
Belgium (Flemish)	10	0
Thailand	10	0
New Zealand	10	0
Moldova	10	0
England	9	0
Finland	8	$\blacksquare$
Czech Republic	8	$\blacksquare$
Latvia (LSS)	8	$\blacksquare$
Cyprus	7	$\blacksquare$
Italy	6	$\blacksquare$
Israel	5	$\blacksquare$
Lithuania	4	$\blacksquare$
Jordan	3	$\blacksquare$
Iran, Islamic Rep.	2	$\blacksquare$
Indonesia	2	$\blacksquare$
Macedonia, Rep. of	2	$\blacksquare$
Chile	2	$\blacksquare$
Turkey	2	* *
Tunisia	1	$\blacksquare$
Philippines	1	$\blacksquare$
South Africa	1	$\blacksquare$
Morocco	0	$\blacksquare$

# Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

#### Height of stack from paper thickness

A sheet of paper is 0.012 cm thick. Of the following, which would be the height of a stack of 400 sheets of this paper?

A. 0.048 cm

B. 0.48 cm

C. 4.8 cm

D. 48 cm

Item Number: T04

#### **Overall Percent Correct**

Japan		
	83	
Singapore	80	
Hong Kong, SAR	78	
Chinese Taipei	75	
Korea, Rep. of	75	
Belgium (Flemish)	75	
Netherlands	72	
Finland	72	
Czech Republic	70	
Slovak Republic	69	<b>A A A A</b>
Malaysia	67	
Canada	67	
Hungary	65	
Slovenia	62	<b>A A A</b>
United States	62	
Australia	59	
Latvia (LSS)	59	0
Russian Federation	59	0
Lithuania	54	0
Bulgaria	54	0
New Zealand	54	0
International Average	54	
England	53	0
Moldova	49	0
Italy	48	0
,	47	
Israel	47	
Israel Romania	47 46	0
		<ul><li>▼</li><li>○</li><li>▼</li></ul>
Romania Thailand	46	<ul><li>▼</li><li>○</li><li>▼</li></ul>
Romania	46 45	<ul><li>▼</li><li>○</li><li>▼</li><li>▼</li></ul>
Romania Thailand Cyprus Jordan	46 45 44	▼ ○ ▼ ▼
Romania Thailand Cyprus Jordan Turkey	46 45 44 36 36	<ul><li>▼</li><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep.	46 45 44 36 36 33	• • • • • • • • • • • • • • • • • • •
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep. Macedonia, Rep. of	46 45 44 36 36 33 33	<ul><li>O</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><l< td=""></l<></ul>
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep. Macedonia, Rep. of Indonesia	46 45 44 36 36 33 33	<ul><li>O</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><l< td=""></l<></ul>
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep. Macedonia, Rep. of Indonesia Tunisia	46 45 44 36 36 33 33 33 31	• •
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep. Macedonia, Rep. of Indonesia Tunisia Chile	46 45 44 36 36 33 33 33 31 23	• •
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep. Macedonia, Rep. of Indonesia Tunisia Chile Philippines	46 45 44 36 36 33 33 33 31 23 22	
Romania Thailand Cyprus Jordan Turkey Iran, Islamic Rep. Macedonia, Rep. of Indonesia Tunisia Chile	46 45 44 36 36 33 33 33 31 23	

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

#### Two possibilities for actual height

The height of a boy was reported as 140 cm. The height had been rounded to the nearest 10 cm. What are two possibilities for the boy's actual height?				
Answer:	cm and	cm		

Item Number: V01

#### **SCORING**

#### **Correct Response**

- One answer 140 and the other answer is in an acceptable range, 135  $\leq x \leq$  140 or 140  $\leq x \leq$  145.
- Neither answer is 140 cm but both are in the acceptable range  $135 \le x < 140$  and/or 140 < x < 145.

#### **Incorrect Response**

- Both answers within the intervals  $145 \le x \le 150$  and/or  $130 \le x \le 135$
- 130 AND 150
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

#### **Overall Percent Correct**

Finland Czech Republic Slovak Republic Singapore Canada Australia Russian Federation Japan Korea, Rep. of	85 82 79 78 72 69 69	<b>A A A A A A</b>
Slovak Republic Singapore Canada Australia Russian Federation Japan	79 78 72 69	<b>A A A A</b>
Singapore Canada Australia Russian Federation Japan	78 72 69 69	<b>A A A A</b>
Canada Australia Russian Federation Japan	72 69 69	<b>A A</b>
Australia Russian Federation Japan	69 69	<b>A</b>
Russian Federation Japan	69	<b>A</b>
Japan		
'	69	
Korea, Rep. of		
	66	
Hungary	66	
Hong Kong, SAR	66	
Chinese Taipei	65	
Netherlands	64	
Belgium (Flemish)	61	
England	61	
Thailand	61	
New Zealand	58	
Lithuania	57	
United States	56	
International Average	44	
Israel	44	O
Moldova	43	O
Slovenia	41	O
Bulgaria	40	0
Latvia (LSS)	39	Ο
Malaysia	33	•
Jordan	29	•
Italy	25	•
Indonesia	24	
Cyprus	21	
Romania	15	
A4 1 ' D (	13	
Macedonia, Rep. of		
Philippines	9	
	8	<b>*</b>
Philippines Chile Tunisia		<b>▼</b>
Philippines Chile Tunisia South Africa	8 7 6	* * * * * * * * * * * * * * * * * * *
Philippines Chile Tunisia	8 7 6 5	* * * * * * * * * * * * * * * * * * *
Philippines Chile Tunisia South Africa	8 7 6	* * * * * * * * * * * * * * * * * * *

# Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

## Ratio of nitrate to total fertilizer

In making a garden fertilizer, a gardener mixes 2 kg of a nitrate, 3 kg of a phosphate, and 6 kg of potash. What is the ratio of nitrate to the total amount of fertilizer?

- A.  $\frac{11}{9}$
- B.  $\frac{2}{3}$
- C.  $\frac{2}{9}$
- $D.\,\frac{2}{11}$

Item Number: V03

**Correct Response:** 

D

# **Overall Percent Correct**

Singapore Korea, Rep. of Chinese Taipei Netherlands Hong Kong, SAR Finland Malaysia Japan Canada United States Belgium (Flemish) Slovenia Hungary Australia Italy	87 84 74 74 65 62 61 55 55 54 53 50 48 47	
Russian Federation	46	0
International Averag		
New Zealand	44	0
Thailand	44	0
Indonesia	43	Ο
England	42	Ο
Romania	40	0
Bulgaria	40	0
Cyprus	40	0
Israel	40	0
Slovak Republic	37	0
Jordan	36	•
Latvia (LSS)	35	•
Turkey	35	•
Iran, Islamic Rep.	35	•
Moldova	34	•
Czech Republic	30	•
Tunisia	29	•
Macedonia, Rep. of	26	•
Lithuania	23	O V
Chile	22	•
Philippines	21	•
Morocco	15	•
South Africa	15	•

Country average vs. International average:

Content Domain	Cognitive Domain
Algebra	Knowing

# Equation representing relationship

n is a number. When n is multiplied by 7, and 6 is then added, the result is 41. Which of these equations represents this relation?

A. 7n + 6 = 41

B.  $7n \pm 6 = 41$ 

C.  $7n \times 6 = 41$ 

D. 7(n + 6) = 41

Item Number: B12

# Correct Response:

Α

## **Overall Percent Correct**

Hong Kong, SAR	93	
Singapore	89	
Japan	86	
Korea, Rep. of	85	
Chinese Taipei	84	
Slovenia	83	
Canada	82	
Russian Federation	82	
Slovak Republic	81	
Belgium (Flemish)	81	
Netherlands	80	
Hungary	80	
United States	77	
Bulgaria	76	
Australia	72	
Czech Republic	72	
Latvia (LSS)	71	
Lithuania	71	O
Finland	68	O
Israel	68	O
Thailand	67	O
Romania	67	O
Cyprus	66	O
International Average	65	

Moldova	65	0
Macedonia, Rep. of	63	0
England	62	0
Italy	58	$\blacksquare$
New Zealand	58	$\blacksquare$
Tunisia	58	$\blacksquare$
Malaysia	57	$\blacksquare$
Jordan	46	$\blacksquare$
Iran, Islamic Rep.	46	$\blacksquare$
Turkey	41	$\blacksquare$
Chile	38	$\blacksquare$
Indonesia	37	$\blacksquare$
Morocco	35	$\blacksquare$
South Africa	21	$\blacksquare$
Philippines	19	$\blacksquare$

# Country average vs. International average:

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

# Value of x from equivalent ratios

If the ratio 7 to 13 is the same as the ratio $x$ to 52, what is the value of $x$ ?
A. 7
B. 13
C. 28
D. 364

Item Number: D08

# **Overall Percent Correct**

١	Singapore	96	
١	Korea, Rep. of	93	
١	Chinese Taipei	90	
١	Hong Kong, SAR	88	
١	Malaysia	84	
١	Canada	84	
١	Japan	82	
١	Australia	80	
١	United States	78	
١	Slovenia	77	
١	Russian Federation	76	
١	Hungary	75	
١	Belgium (Flemish)	75	
١	Italy	74	0
١	New Zealand	73	0
١	England	73	0
١	Thailand	72	0
١	Netherlands	70	0
١	Cyprus	70	0
١	Czech Republic	70	0
ľ	International Averag	e 69	
ľ	Slovak Republic	68	0
	Slovak Republic Bulgaria		0
	'	68	
	Bulgaria	68 68	O
	Bulgaria Latvia (LSS)	68 68 66	0
	Bulgaria Latvia (LSS) Macedonia, Rep. of	68 68 66 66	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania	68 68 66 66 64	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland	68 68 66 66 64 63	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan	68 68 66 66 64 63 61	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel	68 68 66 66 64 63 61	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova	68 68 66 66 64 63 61 61	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia	68 68 66 66 64 63 61 61 60	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia	68 68 66 66 64 63 61 61 60 60	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia Turkey	68 68 66 64 63 61 61 60 60 59	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia Turkey Iran, Islamic Rep.	68 68 66 66 64 63 61 61 60 60 59	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia Turkey Iran, Islamic Rep. Lithuania	68 68 66 66 64 63 61 61 60 60 59 59 58	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia Turkey Iran, Islamic Rep. Lithuania Chile	68 68 66 64 63 61 61 60 60 59 59 58 58	0 0 0
	Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia Turkey Iran, Islamic Rep. Lithuania Chile Philippines	68 68 66 64 63 61 61 60 60 59 59 58 49 47	0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

C

Content Domain	Cognitive Domain
Algebra	Knowing

## Equation to determine cost of cards

The cost, C, of printing greeting cards consists of a fixed charge of 100 cents and a charge of 6 cents for each card printed. Which of these equations can be used to determine the cost of printing n cards?

A. 
$$C = (100 + 6n)$$
 cents

B. 
$$C = (106 + n)$$
 cents

C. 
$$C = (6 + 100n)$$
 cents

D. 
$$C = (106n)$$
 cents

E. 
$$C = (600n)$$
 cents

Item Number: D10

## **Overall Percent Correct**

Chinese Taipei	78	
Japan	75	<b>A</b>
Hong Kong, SAR	74	
Korea, Rep. of	74	<b>A A A</b>
Netherlands	74	
Thailand	69	
Singapore	64	
Bulgaria	62	
Belgium (Flemish)	60	
Canada	56	<b>▲ ▲ O</b>
Slovenia	55	
Australia	55	0
United States	55	
Russian Federation	54	0
England	53	0
Indonesia	53	0
New Zealand	52	0
Macedonia, Rep. of	51	0
Philippines	51	0
Czech Republic	51	0
International Averag	e 50	
1	<b>e 50</b> 48	0
International Averag Hungary Finland		0
International Averag Hungary	48	0
International Averag Hungary Finland	48 48	0 0
International Averag Hungary Finland Slovak Republic	48 48 47	0 0
International Averag Hungary Finland Slovak Republic Cyprus	48 48 47 46	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan	48 48 47 46 46	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania	48 48 47 46 46 45	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy	48 48 47 46 46 45 42	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel	48 48 47 46 46 45 42	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia	48 48 47 46 46 45 42 42	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia Lithuania	48 48 47 46 46 45 42 42 42	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova	48 48 47 46 46 45 42 42 42 42	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep.	48 48 47 46 46 45 42 42 42 41 37	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep. Latvia (LSS)	48 48 47 46 46 45 42 42 42 41 37 33	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep.	48 48 47 46 46 45 42 42 42 41 37 33 30	0 0
International Averag Hungary Finland Slovak Republic Cyprus Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep. Latvia (LSS)	48 48 47 46 46 45 42 42 42 41 37 33 30 29	0

# Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Α

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

## Find 1/3 of number from relationship

If 4 times a number is 48, what is  $\frac{1}{3}$  of the number?

A. 4

B. 8

C. 12

D. 16

Item Number: F11

Correct Response:

Α

# **Overall Percent Correct**

Hong Kong, SAR	89	
Korea, Rep. of	85	
Chinese Taipei	83	<b>A A A A A</b>
Singapore	82	<b>A</b>
Japan	73	<b>A</b>
Belgium (Flemish)	72	
Finland	68	<b>A</b>
Bulgaria	66	
Hungary	63	
Russian Federation	63	
Australia	54	<b>A</b>
Slovenia	54	<b>A</b>
Malaysia	54	<b>A</b>
Canada	53	
United States	50	0
Cyprus	49	0
International Average	e <b>47</b>	
Latvia (LSS)	46	Ο
Israel	44	0
Turkey	44	0
•		
New Zealand	43	0
•		O O
New Zealand	43	0 0 0
New Zealand Romania	43 41	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic	43 41 41	0 0 0
New Zealand Romania Netherlands Moldova	43 41 41 41	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic	43 41 41 41 40	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan	43 41 41 41 40 40	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic	43 41 41 41 40 40 38	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan	43 41 41 41 40 40 38 36	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep.	43 41 41 40 40 38 36 36 34	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of	43 41 41 40 40 38 36 36 34	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand	43 41 41 40 40 38 36 36 34	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy	43 41 41 40 40 38 36 36 34 31	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa	43 41 41 40 40 38 36 36 34 31 29 27	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa Chile	43 41 41 40 40 38 36 36 34 31 29 27 23	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa Chile Indonesia	43 41 41 40 40 38 36 36 34 31 29 27 23 20	0 0 0
New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa Chile Indonesia Lithuania	43 41 41 40 40 38 36 36 34 31 29 27 23 20 19	0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Algebra	Knowing

## Equation from x/y table

The table shows a relation between x and y.

x	2	3	4	5
у	7	10	13	16

Which of these equations expresses this relation?

- A. y = x + 5
- B.  $y = x \pm 5$
- $\text{C.} \quad y = \frac{1}{3}(x \pm 1)$
- D. y = 3x + 1

Item Number: H10

## **Overall Percent Correct**

Korea, Rep. of	84	
Hungary	80	
Japan	76	
Chinese Taipei	72	
Singapore	71	
Netherlands	71	
Australia	68	
Hong Kong, SAR	68	
Russian Federation	65	
Slovenia	60	
Belgium (Flemish)	60	
United States	57	
England	57	
Slovak Republic	57	0
Canada	55	
Czech Republic	53	O
New Zealand	52	0
Macedonia, Rep. of	51	0
Malaysia	51	0
Jordan	50	0
Latvia (LSS)	50	0
International Average	40	

49	
47	0
41	$\blacksquare$
41	$\blacksquare$
40	$\blacksquare$
39	$\blacksquare$
37	$\blacksquare$
36	$\blacksquare$
36	$\blacksquare$
36	$\blacksquare$
33	$\blacksquare$
32	$\blacksquare$
31	$\blacksquare$
31	$\blacksquare$
22	$\blacksquare$
21	$\blacksquare$
20	$\blacksquare$
19	$\blacksquare$
	47 41 40 39 37 36 36 36 33 32 31 31 22 21

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

Content Domain	Cognitive Domain
Algebra	Knowing

# Symbolic linear equation of magazines

represents the number of magazines that Lina reads each week. Which of these represents the total number of magazines that Lina reads in 6 weeks?

A. 6+

B. 6×■

C. =+6

D. ( + ) × 6

Item Number: H12

**Correct Response:** 

В

## **Overall Percent Correct**

Singapore	95	
Belgium (Flemish)	88	
Chinese Taipei	87	
Netherlands	87	
Canada	86	
United States	86	
Malaysia	86	
Japan	85	
Australia	83	
Finland	82	
Hungary	81	
Slovenia	81	
Korea, Rep. of	81	
Czech Republic	80	
England	79	
Slovak Republic	79	
New Zealand	77	
Latvia (LSS)	77	
Russian Federation	77	0
Israel	77	
Cyprus	75	0
Tunisia	75	O
Bulgaria	73	0
Italy	72	0

iliterilational Average	12	
Romania	71	0
Lithuania	66	0
Hong Kong, SAR	64	$\blacksquare$
Jordan	64	•
Thailand	63	•
Moldova	63	$\blacksquare$
Indonesia	54	•
Chile	54	•
Iran, Islamic Rep.	51	$\blacksquare$
Turkey	51	•
Macedonia, Rep. of	47	•
Philippines	45	•
Morocco	44	•
South Africa	36	•

Country average vs. International average:

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

## Missing number in table

# The table represents a relation between x and y. What is the missing number in the table? 9 A. X 2 5 B. 10 3 7 ? 4 C. 11 15 12 D. E. 13

Item Number: J17

# **Overall Percent Correct**

Netherlands	81	<b>A</b>
Chinese Taipei	79	
Japan	78	<b>A A A A</b>
Korea, Rep. of	78	
Hong Kong, SAR	77	
Hungary	74	
Slovenia	73	
New Zealand	72	
Canada	71	0
Australia	70	0
Moldova	69	0
Israel	69	0
Slovak Republic	68	0
Thailand	68	0
Belgium (Flemish)	67	0
Finland	67	0
Singapore	67	0
Russian Federation	66	0
Italy	65	0
Tunisia	65	0
14111514		
Lithuania	65	0
	65	0
Lithuania	65	0
Lithuania International Averag	65 <b>e 65</b>	
Lithuania International Averag Latvia (LSS)	65 <b>e 65</b> 65	0
Lithuania International Averag Latvia (LSS) Bulgaria	65 <b>e 65</b> 65 64	0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus	65 <b>e 65</b> 65 64 64	0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania	65 <b>e 65</b> 65 64 64 63	0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States	65 e 65 65 64 64 63 63	0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic	65 e 65 65 64 64 63 63 63	0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of	65 e 65 65 64 64 63 63 63 63	0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England	65 65 65 64 64 63 63 63 63 63	0 0 0 0 0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan	65 e 65 65 64 64 63 63 63 63 62 61	0 0 0 0 0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia	65 e 65 65 64 64 63 63 63 63 62 61 58	0 0 0 0 0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey	65 e 65 65 64 64 63 63 63 63 62 61 58 58	0 0 0 0 0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia	65 e 65 65 64 64 63 63 63 63 62 61 58 58 57	0 0 0 0 0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep.	65 e 65 65 64 64 63 63 63 63 62 61 58 58 57 53	0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep. Philippines	65 e 65 65 64 64 63 63 63 63 62 61 58 57 53 48	0 0 0 0 0 0
Lithuania International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep. Philippines Chile	65 e 65 65 64 64 63 63 63 63 62 61 58 57 53 48 47	0 0 0 0 0 0 0 0 0

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

Α

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

## Distance traveled by elevator

In a sequence of starts and stops, an elevator travels from the first floor to the fifth floor and then to the second floor. From there, the elevator travels to the fourth floor and then to the third floor. If the floors are 3 m apart, how far has the elevator traveled?

A. 18 m

B. 27 m

C. 30 m

D. 45 m

Item Number: L12

## **Overall Percent Correct**

Korea, Rep. of 77  Japan 74  Chinese Taipei 72	
Hong Kong, SAR 72 ▲	
Finland 72	
Belgium (Flemish) 70	
Belgium (Flemish) 70 ▲ Australia 69 ▲ Singapore 69 ▲	
Singapore 69	
Czech Republic 66	
Czech Republic 66 AMalaysia 63	
Slovak Republic 62 O	
Hungary 61 ▲	
Canada 60 🔺	
Lithuania 60 O	
New Zealand 59 O	
Russian Federation 59 O	
Slovenia 58 O	
Netherlands 58 O	
England 57 O	
Latvia (LSS) 55 O	
United States 55 O	
International Average 53	
Cyprus 52 O	
Italy 51 O	
Moldova 49 O	
Macedonia, Rep. of 45 O	
Tunisia 44 V	
Turkey 43 V	
Romania 42 V	
Jordan 39 V	
Chile 39 ▼	
Israel 39	
Israel 39 V Iran, Islamic Rep. 38 V	
Israel 39 V Iran, Islamic Rep. 38 V Thailand 38 V	
Israel 39 V Iran, Islamic Rep. 38 V Thailand 38 V Indonesia 37 V	
Israel 39 V Iran, Islamic Rep. 38 V Thailand 38 V Indonesia 37 V South Africa 33 V	
Israel 39 V Iran, Islamic Rep. 38 V Thailand 38 V Indonesia 37 V South Africa 33 V	
Iran, Islamic Rep. 38 ▼ Thailand 38 ▼ Indonesia 37 ▼ South Africa 33 ▼	

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

C

Content Domain	Cognitive Domain
Algebra	Communicating and Reasoning

## Correct equation based on x/y table

The table represents a relation between x and y.

Which of the following equations could represent the same relation?

- A. y = 2x + 2
- B. y = 2x 1
- C. y = 3x + 2
- D. y = 3x + 1
- E. y = 3x 2

# x y 1 1 2 4 3 7 4 10

Item Number: L14

# **Overall Percent Correct**

Korea, Rep. of	80	
Hungary	75	
Chinese Taipei	75	
Singapore	74	
Hong Kong, SAR	74	
Japan	69	
Belgium (Flemish)	67	
Australia	64	
Netherlands	64	
Russian Federation	61	
Slovak Republic	56	
Slovenia	54	0
Canada	53	0
England	51	0
Czech Republic	50	0
United States	49	0
New Zealand	49	0
Macedonia, Rep. of	48	0
Jordan	48	0
Latvia (LSS)	45	0

International Average	45	
Bulgaria	44	0
Israel	41	O
Malaysia	41	O
Italy	39	O
Lithuania	36	O
Romania	35	O
Tunisia	33	•
Moldova	33	•
Finland	32	•
Indonesia	27	•
Thailand	24	•
Cyprus	24	•
Iran, Islamic Rep.	22	•
Turkey	21	•
South Africa	14	•
Morocco	14	•
Philippines	13	$\blacksquare$
Chile	12	•

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

Е

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

# Values in proportionality table

The table shows some values of x and y, where x is proportional to y.

х	4	8	Q
у	9	P	45

What are the values of P and Q?

A. 
$$P = 40$$
 and  $Q = 13$ 

B. 
$$P = 18$$
 and  $Q = 17$ 

C. 
$$P = 20$$
 and  $Q = 18$ 

D. 
$$P = 40$$
 and  $Q = 18$ 

E. 
$$P = 18$$
 and  $Q = 20$ 

Item Number: L15

## **Overall Percent Correct**

Chinese Taipei	69	
Japan	62	
Singapore	57	
Korea, Rep. of	54	
Hong Kong, SAR	51	
Belgium (Flemish)	49	
Netherlands	49	
Russian Federation	43	
Malaysia	43	
Slovak Republic	38	0
Canada	38	0
Hungary	38	0
Jordan	37	0
Slovenia	34	0
United States	34	0
Romania	34	0
International Averag	e 33	

International Average	33	
Australia	33	0
Bulgaria	32	O
Thailand	30	0
Indonesia	29	O
Italy	28	O
Czech Republic	28	O
England	28	0
Lithuania	26	0
Moldova	26	O
Cyprus	26	0
New Zealand	24	•
Turkey	24	<b>▼</b>
Iran, Islamic Rep.	24	•
Latvia (LSS)	23	•
Macedonia, Rep. of	23	•
South Africa	21	<u>*</u>
Finland	21	_
Philippines	21	<b>V</b>
Israel	20	
Morocco	17	$\blacksquare$
Chile	15	•
Tunisia	15	•

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

E

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

## Value of x in mathematical equation

Find the value of $x$ if $12x - 10 = 6x + 32$
Answer:

Item Number: L17

## **SCORING**

## **Correct Response**

• 7

- Incorrect Response  $3\frac{2}{3}$  OR  $2\frac{1}{3}$  OR  $1\frac{2}{9}$  [uses incorrect operation: 32 10 = 22, 12x + 6x = 18x, or both]
- Any expression or equation, other than x = 7, containing x
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

# **Overall Percent Correct**

Japan	85	
Hong Kong, SAR	80	
Korea, Rep. of	80	
Slovak Republic	78	
Russian Federation	77	
Slovenia	76	
Singapore	75	
Hungary	74	
Chinese Taipei	73	
Romania	70	
Czech Republic	66	
Lithuania	62	
Latvia (LSS)	58	
Belgium (Flemish)	58	
Moldova	56	
Macedonia, Rep. of	54	0
Cyprus	51	0
Israel	51	0
Italy	46	0
International Average	ie 44	
	16 4 <del>4</del>	
		0
Malaysia	43 34	O ▼
	43	$\blacksquare$
Malaysia Bulgaria	43 34	$\blacksquare$
Malaysia Bulgaria United States	43 34 34	$\blacksquare$
Malaysia Bulgaria United States Canada	43 34 34 33	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey	43 34 34 33 32	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand	43 34 34 33 32 31	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia	43 34 34 33 32 31 29	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland	43 34 34 33 32 31 29 26 24	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England	43 34 34 33 32 31 29 26	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands	43 34 34 33 32 31 29 26 24 23 19	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Iran, Islamic Rep.	43 34 34 33 32 31 29 26 24 23	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands New Zealand	43 34 34 33 32 31 29 26 24 23 19	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia	43 34 34 33 32 31 29 26 24 23 19 19 18	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile	43 34 33 32 31 29 26 24 23 19 19 18 18	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile Morocco	43 34 34 33 32 31 29 26 24 23 19 19 18 18 12 7	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile Morocco Philippines	43 34 34 33 32 31 29 26 24 23 19 19 18 18 12 7 6	$\blacksquare$
Malaysia Bulgaria United States Canada Turkey Australia Thailand England Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile Morocco	43 34 34 33 32 31 29 26 24 23 19 19 18 18 12 7	

#### Country average vs. International average:

Higher	
Not different	0
Lower	$\blacksquare$

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

## Value of expression substituting x=3

If $x = 3$ , what is the value of $\frac{5x + 3}{4x - 3}$ ?
Answer:

Item Number: N13

## **SCORING**

#### **Correct Response**

- . 2
- 18/9, 2/1 or other fraction equivalent to 2
- · Other correct

#### **Incorrect Response**

- Indicates the correct substitution of *x* = 3 in numerator and/or denominator but student did not correctly complete the solution.
- Indicates a wrong substitution such as 5x = 53 or 5x = 5 + 3 in the numerator; for example, any fractions with 56 or 11 as numerators, or 40 or 4 as denominators.
- ullet A response containing the variable x
- Cancels or ignores x's (e.g., 8/1, 8, 7, etc.)
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

## **Overall Percent Correct**

Singapore         83         ▲           Chinese Taipei         81         ▲           Hong Kong, SAR         81         ▲           Hungary         80         ▲           Russian Federation         79         ▲           Slovenia         75         ▲           Korea, Rep. of         75         ▲           Slovak Republic         72         ▲           Japan         69         ▲           Lithuania         67         ▲           Belgium (Flemish)         67         ▲           Canada         67         ▲           Bulgaria         65         ▲           Latvia (LSS)         64         ▲           Czech Republic         62         O           United States         61         ▲           Australia         61         O           Romania         59         O           Moldova         57         O           International Average         53           Nacedonia, Rep. of         53         O           Israel         53         O           Netherlands         50         O           Malaysia         48 <th></th> <th></th> <th></th>			
Hong Kong, SAR 81 Hungary 80 Russian Federation 79 Slovenia 75 Korea, Rep. of 75 Slovak Republic 72 Japan 69 Lithuania 67 Belgium (Flemish) 67 Canada 67 Bulgaria 65 Latvia (LSS) 64 Czech Republic 62 United States 61 Australia 61 Romania 59 Moldova 57  International Average 53  Macedonia, Rep. of 53 Israel 53 Netherlands 50 Malaysia 48 Cyprus 47 Thailand 47 Tunisia 47 Italy 47 England 46 Finland 44 New Zealand 42 Jordan 40 Turkey 35 Indonesia 28 Iran, Islamic Rep. 28 Philippines 15 Chile 14 Morocco 12	Singapore	83	
Hungary 80	Chinese Taipei	81	
Russian Federation 79 Slovenia 75 Korea, Rep. of 75 Slovak Republic 72 Japan 69 Lithuania 67 Belgium (Flemish) 67 Canada 67 Bulgaria 65 Latvia (LSS) 64 Czech Republic 62 United States 61 Australia 61 Romania 59 Moldova 57  International Average 53  Macedonia, Rep. of 53 Israel 53 Netherlands 50 Malaysia 48 Cyprus 47 Thailand 47 Tunisia 47 Italy 47 England 46 Finland 44 New Zealand 42 Jordan 40 Turkey 35 Indonesia 28 Iran, Islamic Rep. 28 Philippines 15 Chile 14 Morocco 12		81	
Slovenia	Hungary	80	
Korea, Rep. of         75           Slovak Republic         72           Japan         69           Lithuania         67           Belgium (Flemish)         67           Canada         67           Bulgaria         65           Latvia (LSS)         64           Czech Republic         62           United States         61           Australia         61           Romania         59           Moldova         57           International Average         53           Macedonia, Rep. of         53           Israel         53           Netherlands         50           Malaysia         48           Cyprus         47           Thailand         47           Italy         47           England         46           Finland         44           New Zealand         42           Jordan         40           Turkey         35           Indonesia         28           Iran, Islamic Rep.         28           Philippines         15           Chile         14           Morocco	Russian Federation	79	
Slovak Republic   72	Slovenia	75	
Japan       69       ▲         Lithuania       67       ▲         Belgium (Flemish)       67       ▲         Canada       67       ▲         Bulgaria       65       ▲         Latvia (LSS)       64       ▲         Czech Republic       62       O         United States       61       ▲         Australia       61       O         Romania       59       O         Moldova       57       O         International Average       53       O         Israel       53       O         Israel       53       O         Netherlands       50       O         Malaysia       48       O         Cyprus       47       O         Thailand       47       V         Italy       47       O         England       46       O         Finland       44       V         New Zealand       42       V         Jordan       40       V         Turkey       35       V         Indonesia       28       V         Iran, Islamic Rep.       28 <td>Korea, Rep. of</td> <td>75</td> <td></td>	Korea, Rep. of	75	
Lithuania       67       ▲         Belgium (Flemish)       67       ▲         Canada       67       ▲         Bulgaria       65       ▲         Latvia (LSS)       64       ▲         Czech Republic       62       O         United States       61       ▲         Australia       61       O         Romania       59       O         Moldova       57       O         International Average       53       O         Israel       53       O         Israel       53       O         Netherlands       50       O         Malaysia       48       O         Cyprus       47       O         Thailand       47       V         Italy       47       O         England       46       O         Finland       44       V         New Zealand       42       V         Jordan       40       V         Turkey       35       V         Indonesia       28       V         Iran, Islamic Rep.       28       V         Philippines	Slovak Republic	72	
Belgium (Flemish)         67         ▲           Canada         67         ▲           Bulgaria         65         ▲           Latvia (LSS)         64         ▲           Czech Republic         62         O           United States         61         ▲           Australia         61         O           Romania         59         O           Moldova         57         O           International Average         53         O           Macedonia, Rep. of         53         O           Israel         53         O           Netherlands         50         O           Malaysia         48         O           Cyprus         47         O           Thailand         47         V           Italy         47         O           England         46         O           Finland         44         V           Jordan         40         V           Turkey         35         V           Indonesia         28         V           Indonesia         15         V           Chile         14         V	Japan	69	
Canada       67         Bulgaria       65         Latvia (LSS)       64         Czech Republic       62         United States       61         Australia       61         Romania       59         Moldova       57         International Average       53         Macedonia, Rep. of       53         Israel       53         Netherlands       50         Malaysia       48         Cyprus       47         Thailand       47         Italy       47         England       46         Finland       44         New Zealand       42         Jordan       40         Turkey       35         Indonesia       28         Iran, Islamic Rep.       28         Philippines       15         Chile       14         Morocco       12	Lithuania	67	
Bulgaria       65         Latvia (LSS)       64         Czech Republic       62         United States       61         Australia       61         Romania       59         Moldova       57         International Average         3       Macedonia, Rep. of         53       O         Israel       53         Netherlands       50         Malaysia       48         Cyprus       47         Thailand       47         Tunisia       47         Italy       47         England       46         Finland       44         New Zealand       42         Jordan       40         Turkey       35         Indonesia       28         Iran, Islamic Rep.       28         Philippines       15         Chile       14         Morocco       12	Belgium (Flemish)	67	
Latvia (LSS)       64       ▲         Czech Republic       62       O         United States       61       ▲         Australia       61       O         Romania       59       O         Moldova       57       O         International Average       53         Macedonia, Rep. of       53       O         Israel       53       O         Netherlands       50       O         Malaysia       48       O         Cyprus       47       O         Thailand       47       V         Italy       47       O         England       46       O         Finland       44       V         New Zealand       42       V         Jordan       40       V         Turkey       35       V         Indonesia       28       V         Iran, Islamic Rep.       28       V         Philippines       15       V         Chile       14       V	Canada	67	
Czech Republic       62       0         United States       61       ▲         Australia       61       ○         Romania       59       ○         Moldova       57       ○         International Average       53         Macedonia, Rep. of       53       ○         Israel       53       ○         Netherlands       50       ○         Malaysia       48       ○         Cyprus       47       ○         Thailand       47       ▼         Italy       47       ▼         England       46       ○         Finland       44       ▼         New Zealand       42       ▼         Jordan       40       ▼         Turkey       35       ▼         Indonesia       28       ▼         Iran, Islamic Rep.       28       ▼         Philippines       15       ▼         Chile       14       ▼         Morocco       12       ▼	Bulgaria	65	
United States 61 Australia 61 Romania 59 Moldova 57 International Average 53 Macedonia, Rep. of 53 Israel 53 Netherlands 50 Malaysia 48 Cyprus 47 Thailand 47 Tunisia 47 Italy 47 England 46 Finland 44 New Zealand 42 Jordan 40 Turkey 35 Indonesia 28 Iran, Islamic Rep. 28 Philippines 15 Chile 14 Morocco 12	Latvia (LSS)	64	
Australia 61 0 Romania 59 0 Moldova 57 0  International Average 53  Macedonia, Rep. of 53 0 Israel 53 0 Netherlands 50 0 Malaysia 48 0 Cyprus 47 0 Thailand 47 0 Tunisia 47 V Italy 47 0 England 46 0 Finland 44 V New Zealand 42 V Jordan 40 Turkey 35 Indonesia 28 Iran, Islamic Rep. 28 Philippines 15 Chile 14 Morocco 12	Czech Republic	62	0
Romania         59         O           Moldova         57         O           International Average         53           Macedonia, Rep. of         53         O           Israel         53         O           Netherlands         50         O           Malaysia         48         O           Cyprus         47         O           Thailand         47         V           Italy         47         O           England         46         O           Finland         44         V           New Zealand         42         V           Jordan         40         V           Turkey         35         V           Indonesia         28         V           Iran, Islamic Rep.         28         V           Philippines         15         V           Chile         14         V           Morocco         12         V	United States	61	
Moldova         57         O           International Average         53           Macedonia, Rep. of         53         O           Israel         53         O           Netherlands         50         O           Malaysia         48         O           Cyprus         47         O           Thailand         47         V           Italy         47         O           England         46         O           Finland         44         V           New Zealand         42         V           Jordan         40         V           Turkey         35         V           Indonesia         28         V           Iran, Islamic Rep.         28         V           Philippines         15         V           Chile         14         V           Morocco         12         V	Australia	61	0
International Average         53           Macedonia, Rep. of         53         0           Israel         53         0           Netherlands         50         0           Malaysia         48         0           Cyprus         47         0           Thailand         47         V           Italy         47         0           England         46         0           Finland         44         V           New Zealand         42         V           Jordan         40         V           Turkey         35         V           Indonesia         28         V           Iran, Islamic Rep.         28         V           Philippines         15         V           Chile         14         V           Morocco         12         V	Romania	59	0
Macedonia, Rep. of       53       O         Israel       53       O         Netherlands       50       O         Malaysia       48       O         Cyprus       47       O         Thailand       47       V         Italy       47       O         England       46       O         Finland       44       ▼         New Zealand       42       ▼         Jordan       40       ▼         Turkey       35       ▼         Indonesia       28       ▼         Iran, Islamic Rep.       28       ▼         Philippines       15       ▼         Chile       14       ▼         Morocco       12       ▼	Moldova	57	0
Macedonia, Rep. of       53       O         Israel       53       O         Netherlands       50       O         Malaysia       48       O         Cyprus       47       O         Thailand       47       V         Italy       47       O         England       46       O         Finland       44       ▼         New Zealand       42       ▼         Jordan       40       ▼         Turkey       35       ▼         Indonesia       28       ▼         Iran, Islamic Rep.       28       ▼         Philippines       15       ▼         Chile       14       ▼         Morocco       12       ▼	International Averag	e 53	
Israel       53       O         Netherlands       50       O         Malaysia       48       O         Cyprus       47       O         Thailand       47       V         Italy       47       O         England       46       O         Finland       44       ▼         New Zealand       42       ▼         Jordan       40       ▼         Turkey       35       ▼         Indonesia       28       ▼         Iran, Islamic Rep.       28       ▼         Philippines       15       ▼         Chile       14       ▼         Morocco       12       ▼			
Malaysia 48 O Cyprus 47 O Thailand 47 O Tunisia 47 V Italy 47 O England 46 O Finland 44 V New Zealand 42 V Jordan 40 V Turkey 35 V Indonesia 28 V Iran, Islamic Rep. 28 Philippines 15 Chile 14 V Morocco 12	i Macedonia, Neb. Oi	53	O
Cyprus       47       0         Thailand       47       0         Tunisia       47       ▼         Italy       47       0         England       46       0         Finland       44       ▼         New Zealand       42       ▼         Jordan       40       ▼         Turkey       35       ▼         Indonesia       28       ▼         Iran, Islamic Rep.       28       ▼         Philippines       15       ▼         Chile       14       ▼         Morocco       12       ▼	1 '		
Cyprus       47       O         Thailand       47       O         Tunisia       47       ▼         Italy       47       O         England       46       O         Finland       44       ▼         New Zealand       42       ▼         Jordan       40       ▼         Turkey       35       ▼         Indonesia       28       ▼         Iran, Islamic Rep.       28       ▼         Philippines       15       ▼         Chile       14       ▼         Morocco       12       ▼	Israel	53	0
Tunisia 47 V Italy 47 O England 46 O Finland 44 V New Zealand 42 V Jordan 40 V Turkey 35 V Indonesia 28 V Iran, Islamic Rep. 28 Philippines 15 Chile 14 V Morocco 12	Israel Netherlands	53 50	0
Italy 47 O England 46 O Finland 44 ▼ New Zealand 42 ▼ Jordan 40 ▼ Turkey 35 ▼ Indonesia 28 ▼ Iran, Islamic Rep. 28 ▼ Philippines 15 ▼ Chile 14 ▼ Morocco 12	Israel Netherlands Malaysia	53 50 48	0 0
England 46 O Finland 44 ▼ New Zealand 42 ▼ Jordan 40 ▼ Turkey 35 ▼ Indonesia 28 ▼ Iran, Islamic Rep. 28 ▼ Philippines 15 ▼ Chile 14 ▼ Morocco 12	Israel Netherlands Malaysia Cyprus	53 50 48 47	0 0 0
Finland 44 V New Zealand 42 V Jordan 40 V Turkey 35 V Indonesia 28 V Iran, Islamic Rep. 28 V Philippines 15 V Chile 14 V Morocco 12	Israel Netherlands Malaysia Cyprus Thailand	53 50 48 47 47	0 0 0 0
New Zealand 42 ▼ Jordan 40 ▼ Turkey 35 ▼ Indonesia 28 ▼ Iran, Islamic Rep. 28 ▼ Philippines 15 ▼ Chile 14 ▼ Morocco 12	Israel Netherlands Malaysia Cyprus Thailand Tunisia	53 50 48 47 47	0 0 0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy	53 50 48 47 47 47	0 0 0 0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England	53 50 48 47 47 47 47 47	0 0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland	53 50 48 47 47 47 47 46 44	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand	53 50 48 47 47 47 47 46 44 42	0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan	53 50 48 47 47 47 47 46 44 42 40	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey	53 50 48 47 47 47 47 46 44 42 40 35	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Morocco 12 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia	53 50 48 47 47 47 47 46 44 42 40 35 28	0 0 0 0
	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia Iran, Islamic Rep.	53 50 48 47 47 47 46 44 42 40 35 28 28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
South Africa 9 ▼	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia Iran, Islamic Rep. Philippines	53 50 48 47 47 47 46 44 42 40 35 28 28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia Iran, Islamic Rep. Philippines Chile	53 50 48 47 47 47 46 44 42 40 35 28 28 15	0 0 0 0

# Country average vs. International average:

Higher	
Not different	O
Lower	

Content Domain	Cognitive Domain
Algebra	Knowing

## Expression equivalent to $n \times n \times n$

Which of these expressions is equivalent to  $n \times n \times n$  for all values of n?

- A.  $\frac{n}{3}$
- B. n + 3
- C. 3n
- D.  $n^3$

Item Number: P09

**Correct Response:** 

D

# **Overall Percent Correct**

Singapore	90	<b>A</b>
Korea, Rep. of	86	
Hong Kong, SAR	85	
United States	85	
Japan	85	
Tunisia	84	
Chinese Taipei	83	
Czech Republic	81	
Belgium (Flemish)	80	0
Slovak Republic	80	
Indonesia	80	<b>A</b>
Slovenia	80	
Thailand	80	
Hungary	79	
Latvia (LSS)	77	0
Australia	77	0
Russian Federation	76	0
Canada	75	O
Cyprus	74	O
Malaysia	74	O
Italy	72	O
Lithuania	71	O
International Average	71	
Iran, Islamic Rep.	71	O
Bulgaria	69	O
Israel	67	O
Chile	67	0
Romania	66	0
New Zealand	66	0
England	61	<ul><li>○</li><li>▼</li></ul>
Jordan	61	$\blacksquare$
l a a a		

Country average vs. International average:

55

53

53 49

47

Netherlands South Africa

Moldova

Philippines

Finland

Turkey Morocco

Content Domain	Cognitive Domain
Algebra	Knowing

## Equivalent expression: k+k+k+k+k

For all numbers k, k+k+k+k+k can be written as

A. k+5B. 5kC.  $k^5$ D. 5(k+1)

Item Number: P11

# **Overall Percent Correct**

Hong Kong, SAR 80 A Singapore 76 A Chinese Taipei 76 A Hungary 75 Slovenia 72 A Czech Republic 70 A Korea, Rep. of 69 Belgium (Flemish) 69 Russian Federation 68 A Malaysia 67 A Latvia (LSS) 67 A Cyprus 65 O Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62 O Japan 61 O Turkey 59 O Israel 58 O International Average 57 Netherlands 57 Italy 57 Finland 57 Canada 56 Moldova 55 Australia 54 New Zealand 54 Tunisia 53 Lithuania 52 Jordan 48 England 48 United States 46 Indonesia 41 South Africa 38 Philippines 37 Iran, Islamic Rep. 36 Chile 35 Thailand 33 Morocco 19	Slovak Republic	80	
Singapore         76         ▲           Chinese Taipei         76         ▲           Hungary         75         ▲           Slovenia         72         ▲           Czech Republic         70         ▲           Korea, Rep. of         69         ▲           Belgium (Flemish)         69         ▲           Russian Federation         68         ▲           Malaysia         67         ▲           Latvia (LSS)         67         ▲           Cyprus         65         O           Bulgaria         65         O           Romania         65         O           Macedonia, Rep. of         62         O           Japan         61         O           Turkey         59         O           Israel         58         O           International Average         57           Netherlands         57         O           Italy         57         O           Finland         57         O           Canada         56         O           Moldova         55         O           Australia         54         O     <	' '		
Chinese Taipei         76         ▲           Hungary         75         ▲           Slovenia         72         ▲           Czech Republic         70         ▲           Korea, Rep. of         69         ▲           Belgium (Flemish)         69         ▲           Russian Federation         68         ▲           Malaysia         67         ▲           Latvia (LSS)         67         ▲           Cyprus         65         O           Bulgaria         65         O           Romania         65         O           Macedonia, Rep. of         62         O           Japan         61         O           Turkey         59         O           Israel         58         O           International Average         57           Netherlands         57         O           Italy         57         O           Finland         57         O           Koardad         56         O           Moldova         55         O           Australia         54         O           New Zealand         54         O		76	
Hungary         75         ▲           Slovenia         72         ▲           Czech Republic         70         ▲           Korea, Rep. of         69         ▲           Belgium (Flemish)         69         ▲           Russian Federation         68         ▲           Malaysia         67         ▲           Latvia (LSS)         67         ▲           Cyprus         65         O           Bulgaria         65         O           Romania         65         O           Macedonia, Rep. of         62         O           Japan         61         O           Turkey         59         O           Israel         58         O           International Average         57           Netherlands         57         O           Italy         57         O           Italy         57         O           Finland         57         O           Canada         56         O           Moldova         55         O           Australia         54         O           New Zealand         54         O	J 1	76	
Slovenia         72         ▲           Czech Republic         70         ▲           Korea, Rep. of         69         ▲           Belgium (Flemish)         69         ▲           Russian Federation         68         ▲           Malaysia         67         ▲           Latvia (LSS)         67         ▲           Cyprus         65         O           Bulgaria         65         O           Romania         65         O           Macedonia, Rep. of         62         O           Japan         61         O           Turkey         59         O           Israel         58         O           International Average         57           Netherlands         57         O           Italy         57         O           Italy         57         O           Inland         57         O           Value         59         O           Inland         57         O           Inland         57         O           Inland         57         O           Inland         57         O	· ·	75	
Czech Republic       70       ▲         Korea, Rep. of       69       ▲         Belgium (Flemish)       69       ▲         Russian Federation       68       ▲         Malaysia       67       ▲         Latvia (LSS)       67       ▲         Cyprus       65       O         Bulgaria       65       O         Romania       65       O         Macedonia, Rep. of       62       O         Japan       61       O         Turkey       59       O         Israel       58       O         International Average       57         Netherlands       57       O         Italy       57       O         Finland       57       O         Italy       57       O         Finland       57       O         Australia       54       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48	J ,	72	
Korea, Rep. of       69         Belgium (Flemish)       69         Russian Federation       68         Malaysia       67         Latvia (LSS)       67         Cyprus       65         Bulgaria       65         Romania       65         Macedonia, Rep. of       62         Japan       61         Turkey       59         Israel       58         Netherlands       57         Italy       57         Finland       57         Canada       56         Moldova       55         Australia       54         New Zealand       54         Tunisia       53         Lithuania       52         Jordan       48         England       48         United States       46         Indonesia       41         South Africa       38         Philippines       37         Iran, Islamic Rep.       36         Chile       35         Thailand       33	Czech Republic	70	
Belgium (Flemish)       69       ▲         Russian Federation       68       ▲         Malaysia       67       ▲         Latvia (LSS)       67       ▲         Cyprus       65       O         Bulgaria       65       O         Romania       65       O         Macedonia, Rep. of       62       O         Japan       61       O         Turkey       59       O         Israel       58       O         International Average       57       O         Italy       57       O         Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38<	· ·	69	
Russian Federation       68       ▲         Malaysia       67       ▲         Latvia (LSS)       67       ▲         Cyprus       65       O         Bulgaria       65       O         Romania       65       O         Macedonia, Rep. of       62       O         Japan       61       O         Turkey       59       O         Israel       58       O         International Average       57         Netherlands       57       O         Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼<	· ·	69	
Malaysia       67       ▲         Latvia (LSS)       67       ▲         Cyprus       65       O         Bulgaria       65       O         Romania       65       O         Macedonia, Rep. of       62       O         Japan       61       O         Turkey       59       O         Israel       58       O         International Average       57         Netherlands       57       O         Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36	Russian Federation	68	
Latvia (LSS)       67       ▲         Cyprus       65       O         Bulgaria       65       O         Romania       65       O         Macedonia, Rep. of       62       O         Japan       61       O         Turkey       59       O         Israel       58       O         International Average       57         Netherlands       57       O         Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36       ▼         Chile       35	Malaysia	67	
Cyprus       65       ○         Bulgaria       65       ○         Romania       65       ○         Macedonia, Rep. of       62       ○         Japan       61       ○         Turkey       59       ○         Israel       58       ○         International Average       57         Netherlands       57       ○         Italy       57       ○         Finland       57       ○         Canada       56       ○         Moldova       55       ○         Australia       54       ○         New Zealand       54       ○         Tunisia       53       ○         Lithuania       52       ○         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼	1	67	
Romania       65       O         Macedonia, Rep. of       62       O         Japan       61       O         Turkey       59       O         Israel       58       O         International Average       57         Netherlands       57       O         Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼         Thailand       33       ▼	Cyprus	65	
Romania         65         O           Macedonia, Rep. of         62         O           Japan         61         O           Turkey         59         O           Israel         58         O           International Average         57           Netherlands         57         O           Italy         57         O           Finland         57         O           Canada         56         O           Moldova         55         O           Australia         54         O           New Zealand         54         O           Tunisia         53         O           Lithuania         52         O           Jordan         48         ▼           England         48         ▼           United States         46         ▼           Indonesia         41         ▼           South Africa         38         ▼           Philippines         37         ▼           Iran, Islamic Rep.         36         ▼           Chile         35         ▼	Bulgaria	65	0
Japan       61       ○         Turkey       59       ○         Israel       58       ○         International Average       57         Netherlands       57       ○         Italy       57       ○         Finland       57       ○         Canada       56       ○         Moldova       55       ○         Australia       54       ○         New Zealand       54       ○         Tunisia       53       ○         Lithuania       52       ○         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼         Thailand       33       ▼	<u> </u>	65	0
Turkey 59 0	Macedonia, Rep. of	62	0
Israel         58         O           International Average         57           Netherlands         57         O           Italy         57         O           Finland         57         O           Canada         56         O           Moldova         55         O           Australia         54         O           New Zealand         54         O           Tunisia         53         O           Lithuania         52         O           Jordan         48         ▼           England         48         ▼           United States         46         ▼           Indonesia         41         ▼           South Africa         38         ▼           Philippines         37         ▼           Iran, Islamic Rep.         36         ▼           Chile         35         ▼           Thailand         33         ▼	Japan	61	0
International Average         57           Netherlands         57         ○           Italy         57         ○           Finland         57         ○           Canada         56         ○           Moldova         55         ○           Australia         54         ○           New Zealand         54         ○           Tunisia         53         ○           Lithuania         52         ○           Jordan         48         ▼           England         48         ▼           United States         46         ▼           Indonesia         41         ▼           South Africa         38         ▼           Philippines         37         ▼           Iran, Islamic Rep.         36         ▼           Chile         35         ▼           Thailand         33         ▼	Turkey	59	0
Netherlands       57       O         Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼         Thailand       33       ▼	Israel	58	0
Italy       57       O         Finland       57       O         Canada       56       O         Moldova       55       O         Australia       54       O         New Zealand       54       O         Tunisia       53       O         Lithuania       52       O         Jordan       48       ▼         England       48       ▼         United States       46       ▼         Indonesia       41       ▼         South Africa       38       ▼         Philippines       37       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼         Thailand       33       ▼	International Averag	e 57	
Finland 57 O Canada 56 O Moldova 55 O Australia 54 O New Zealand 54 O Tunisia 53 O Lithuania 52 O Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 Iran, Islamic Rep. 36 ▼ Chile 35 ▼			
Canada 56 O Moldova 55 O Australia 54 O New Zealand 54 O Tunisia 53 O Lithuania 52 O Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼		57	
Moldova 55 O Australia 54 O New Zealand 54 O Tunisia 53 O Lithuania 52 O Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼	Netherlands Italy	57 57	0
Australia 54 0 New Zealand 54 0 Tunisia 53 0 Lithuania 52 0 Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Thailand 33 ▼	Netherlands Italy Finland	57 57 57	0
New Zealand 54 O Tunisia 53 O Lithuania 52 O Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼	Netherlands Italy Finland Canada	57 57 57 56	0 0
Tunisia 53 O Lithuania 52 O Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼	Netherlands Italy Finland Canada Moldova	57 57 57 56 55	0 0 0
Lithuania 52 O Jordan 48 ▼ England 48 ▼ United States 46 ▼ Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Thailand 33 ▼	Netherlands Italy Finland Canada Moldova Australia	57 57 57 56 55 54	0 0 0 0 0
Jordan 48 V England 48 V United States 46 V Indonesia 41 V South Africa 38 V Philippines 37 V Iran, Islamic Rep. 36 V Chile 35 V Thailand 33 V	Netherlands Italy Finland Canada Moldova Australia New Zealand	57 57 57 56 55 54 54	0 0 0 0 0 0 0
Jordan 48 V England 48 V United States 46 V Indonesia 41 V South Africa 38 V Iran, Islamic Rep. 36 V Chile 35 V Thailand 33 V Morocco 19	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia	57 57 57 56 55 54 54 54 53	0 0 0 0 0 0 0 0
England 48 V United States 46 V Indonesia 41 V South Africa 38 V Philippines 37 V Iran, Islamic Rep. 36 V Chile 35 V Thailand 33 V Morocco 19	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania	57 57 57 56 55 54 54 54 53	0 0 0 0 0 0 0 0 0 0
United States 46 V Indonesia 41 V South Africa 38 V Philippines 37 V Iran, Islamic Rep. 36 V Chile 35 V Thailand 33 V Morocco 19	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania	57 57 57 56 55 54 54 53 52 48	0 0 0 0 0 0 0 0 0 0
Indonesia 41 ▼ South Africa 38 ▼ Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Thailand 33 ▼ Morocco 19 ▼	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England	57 57 57 56 55 54 54 53 52 48	0 0 0 0 0 0 0 0 0 0
South Africa 38 Philippines 37 Iran, Islamic Rep. 36 Chile 35 Thailand 33 Morocco 19	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States	57 57 57 56 55 54 54 53 52 48	0 0 0 0 0 0 0 0 0 0
Philippines 37 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Thailand 33 ▼ Morocco 19	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States Indonesia	57 57 57 56 55 54 54 53 52 48 48 46 41	0 0 0 0 0 0 0 0 0 0
Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Thailand 33 ▼ Morocco 19	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States Indonesia	57 57 57 56 55 54 54 53 52 48 48 46 41 38	0 0 0 0 0 0 0 0 0 0
Chile 35 ▼ Thailand 33 ▼ Morocco 19 ▼	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States Indonesia South Africa Philippines	57 57 57 56 55 54 54 53 52 48 48 46 41 38 37	0 0 0 0 0 0 0 0 0 0
Thailand 33 ▼ Morocco 19 ▼	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States Indonesia South Africa Philippines Iran, Islamic Rep.	57 57 57 56 55 54 54 53 52 48 46 41 38 37	0 0 0 0 0 0 0 0 0 0
Morocco 19 ▼	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States Indonesia South Africa Philippines Iran, Islamic Rep. Chile	57 57 57 56 55 54 54 53 52 48 46 41 38 37 36 35	0 0 0 0 0 0 0 0 0 0
	Netherlands Italy Finland Canada Moldova Australia New Zealand Tunisia Lithuania Jordan England United States Indonesia South Africa Philippines Iran, Islamic Rep. Chile Thailand	57 57 57 56 55 54 54 53 52 48 46 41 38 37 36 35 33	0 0 0 0 0 0 0 0 0

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

В

Content Domain	Cognitive Domain
Algebra	Knowing

## Expression when a, b, c are real

Which of the following is true when a, b, and c are different real numbers?

A. 
$$a - b = b - a$$

B. 
$$a(b - c) = b(c - a)$$

C. 
$$b - c = c - b$$

D. 
$$ab = ba$$

E. 
$$ab - c = ab - b$$

Item Number: R10

**Correct Response:** 

D

# **Overall Percent Correct**

Russian Federation	72	
Korea, Rep. of	69	
Hong Kong, SAR	67	<b>A A O A A</b>
Chinese Taipei	64	
Hungary	58	
Belgium (Flemish)	56	
Singapore	53	
Czech Republic	50	0
Japan	49	
Slovak Republic	48	
Bulgaria	47	
Canada	43	0
Latvia (LSS)	42	0
Romania	42	0
Australia	41	0
Slovenia	41	0
United States	40	0
Netherlands	40	0
International Averag		
Tunisia	37	0
Moldova	36	0
Moldova Israel	36 35	0
Moldova Israel Jordan	36 35 31	0 0
Moldova Israel Jordan Macedonia, Rep. of	36 35 31 30	0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand	36 35 31 30 30	0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England	36 35 31 30 30	0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania	36 35 31 30 30 30	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand	36 35 31 30 30 30 30 29	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus	36 35 31 30 30 30 30 29 28	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia	36 35 31 30 30 30 30 29 28 26	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy	36 35 31 30 30 30 30 29 28 26 23	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco	36 35 31 30 30 30 30 29 28 26 23 21	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey	36 35 31 30 30 30 30 29 28 26 23 21 20	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland	36 35 31 30 30 30 30 29 28 26 23 21 20	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa	36 35 31 30 30 30 29 28 26 23 21 20 19	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep.	36 35 31 30 30 30 30 29 28 26 23 21 20 19 19	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep. Indonesia	36 35 31 30 30 30 29 28 26 23 21 20 19 18 14	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep. Indonesia Chile	36 35 31 30 30 30 29 28 26 23 21 20 19 19 18 14	0 0 0 0 0 0 0 0 0
Moldova Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep. Indonesia	36 35 31 30 30 30 29 28 26 23 21 20 19 18 14	0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Algebra	Knowing

# Operations on negative number

If k represents a negative number, which of these is a positive number?

A.  $k^2$ 

B.  $k^3$ 

C. 2k

 $D.\frac{k}{2}$ 

Item Number: R12

Correct Response:

Α

# **Overall Percent Correct**

Chinese Taipei Russian Federation Hong Kong, SAR Korea, Rep. of Japan	84 81 79 69	<b>A A A A A</b>
Slovenia	67	_
Latvia (LSS)	67	_
Hungary	67	_
Slovak Republic	66	<u> </u>
Bulgaria	66	
Lithuania	64	
Belgium (Flemish)	63	
Singapore	63	<b>A</b>
Romania	59	
Czech Republic	55	0
Moldova	49	0
Italy	49	0
Israel	48	0
International Averag	e 47	
United States	46	0
Netherlands	42	0
Netherlands Malaysia	42 42	0
Netherlands Malaysia Tunisia	42 42 41	0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of	42 42 41 40	0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada	42 42 41 40 39	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia	42 42 41 40 39 34	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey	42 42 41 40 39 34 33	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand	42 42 41 40 39 34 33 32	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia	42 42 41 40 39 34 33 32 30	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep.	42 42 41 40 39 34 33 32 30 30	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus	42 42 41 40 39 34 33 32 30 30 29	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco	42 42 41 40 39 34 33 32 30 30 29 29	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco Jordan	42 42 41 40 39 34 33 32 30 30 29 29 28	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco Jordan Chile	42 42 41 40 39 34 33 32 30 30 29 29 28 27	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco Jordan Chile England	42 42 41 40 39 34 33 32 30 30 29 29 28 27 27	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco Jordan Chile England Finland	42 42 41 40 39 34 33 32 30 30 29 29 28 27 27 25	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco Jordan Chile England Finland Philippines	42 42 41 40 39 34 33 32 30 30 29 29 28 27 27 25 25	0 0 0 0 0
Netherlands Malaysia Tunisia Macedonia, Rep. of Canada Australia Turkey Thailand Indonesia Iran, Islamic Rep. Cyprus Morocco Jordan Chile England Finland	42 42 41 40 39 34 33 32 30 30 29 29 28 27 27 25	0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

## Total club members: boys and girls

A club has 86 members, and there are 14 more girls than boys. How many boys and how many girls are members of the club?

Show your work.

Item Number: T01

#### **SCORING**

#### **Correct Response**

- 36 boys and 50 girls [Numerical method: e.g.,  $86 \div 2 = 43$ ; 43 7 = 36 boys; 43 + 7 = 50 girls]
- 36 boys and 50 girls [Algebraic method: e.g., b + (b + 14) = 86; 2b = 72; b = 36; g = 36 + 14 = 50]
- Other fully satisfactory method including "guess and check" with justification that 36 + 50 = 86

#### **Partial Response**

- Either 36 boys or 50 girls, with or without another (incorrect) number
- 36 and 50 are given [Makes correct computations but reverses labels or does not include any mention of which is boys or girls]
- 36 boys and 50 girls, no method shown
- Gives an algebraic equation or system of equations that can lead to the correct solution
- · Other partially correct

#### **Incorrect Response**

- 29 boys and 57 girls [Computes 86 ÷ 2 = 43; 43 14 = 29 and 43 + 14 = 57]
- $\bullet$  One of the numbers is 72 [Computes 86 14]
- 29 boys and 43 girls [Computes 43 14 = 29]
- Gives an algebraic equation or system of equations that cannot lead to a correct solution
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

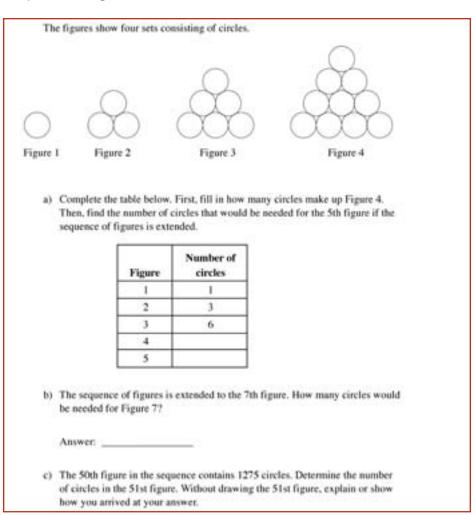
#### **Overall Percent Correct**

Singapore	72	<b>A</b>
Chinese Taipei	66	
Hong Kong, SAR	62	
Belgium (Flemish)	62	
Korea, Rep. of	61	
Slovak Republic	53	
Japan	53	
Hungary	46	
Czech Republic	46	
Canada	42	
Bulgaria	41	0
Russian Federation	40	0
Netherlands	38	0
Romania	38	0
Australia	37	0
Slovenia	37	0
England	34	0
Cyprus	34	0
International Average	e 33	
Finland	32	0
Latvia (LSS)	32	O
Latvia (LSS) New Zealand	32 32	0
( /		
New Zealand	32	0 0
New Zealand Malaysia	32 32	0 0
New Zealand Malaysia Israel	32 32 30	0 0
New Zealand Malaysia Israel United States	32 32 30 29	0 0
New Zealand Malaysia Israel United States Moldova	32 32 30 29 26	0 0
New Zealand Malaysia Israel United States Moldova Italy	32 32 30 29 26 24	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania	32 32 30 29 26 24 23	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey	32 32 30 29 26 24 23 20	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand	32 32 30 29 26 24 23 20	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of	32 32 30 29 26 24 23 20 20	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep.	32 32 30 29 26 24 23 20 20 16	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia	32 32 30 29 26 24 23 20 20 16 14	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan	32 32 30 29 26 24 23 20 20 16 14 14	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan Tunisia	32 32 30 29 26 24 23 20 20 16 14 14 13	0 0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan Tunisia Philippines	32 32 30 29 26 24 23 20 20 16 14 14 13 10 9	0
New Zealand Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan Tunisia Philippines Chile	32 32 30 29 26 24 23 20 20 16 14 13 10 9	0 0

# Country average vs. International average:

Content Domain	Cognitive Domain	
Algebra	Investigating and Solving Problems	

## Sequence of figures with circles



Item Number: V04A

## **SCORING**

A. Scoring for Number of Circles in Figures 4 and 5

## **Correct Response**

• 10 AND 15

#### **Incorrect Response**

- 10 and any number other than 15
- 10 and no numerical response for 5th figure
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

## **Overall Percent Correct**

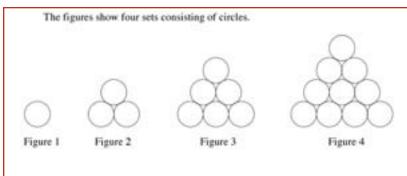
Korea, Rep. of Japan Singapore Chinese Taipei Hong Kong, SAR Netherlands England Belgium (Flemish) Canada Australia New Zealand Finland Czech Republic Hungary Slovenia Slovak Republic Thalaysia United States Russian Federation Italy Fithuania Cyprus Moldova Latvia (LSS) Israel Romania
Singapore Chinese Taipei Hong Kong, SAR Netherlands Sagengland Sengland Selgium (Flemish) Sagengland Sagenglan
Chinese Taipei 87 Hong Kong, SAR 87 Netherlands 83 England 81 Belgium (Flemish) 81 Canada 81 Australia 81 New Zealand 81 Finland 80 Czech Republic 79 Hungary 77 Slovenia 77 Slovak Republic 77 Malaysia 73 United States 73 Bulgaria 68 Russian Federation 67 Italy 66 International Average 65 Lithuania 64 Cyprus 64 Moldova 64 Latvia (LSS) 63 Israel 63 Romania 57 Thailand 54 Macedonia, Rep. of 51 Indonesia 47 Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20
Hong Kong, SAR 87 Netherlands 83 England 81 Belgium (Flemish) 81 Canada 81 Australia 81 New Zealand 81 Finland 80 Czech Republic 79 Hungary 77 Slovenia 77 Slovak Republic 77 Malaysia 73 United States 73 Bulgaria 68 Russian Federation 67 Italy 66 International Average 65 Lithuania 64 Cyprus 64 Moldova 64 Latvia (LSS) 63 Israel 63 Romania 57 Thailand 54 Macedonia, Rep. of 51 Indonesia 47 Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20
Netherlands 83 England 81 Belgium (Flemish) 81 Canada 81 Australia 81 New Zealand 81 Finland 80 Czech Republic 79 Hungary 77 Slovenia 77 Slovak Republic 77 Malaysia 73 United States 73 Bulgaria 68 Russian Federation 67 Italy 66 International Average 65 Lithuania 64 Cyprus 64 Moldova 64 Latvia (LSS) 63 Israel 63 Romania 57 Thailand 54 Macedonia, Rep. of 51 Indonesia 47 Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20
England 81
Belgium (Flemish)         81         ▲           Canada         81         ▲           Australia         81         ▲           New Zealand         81         ▲           Finland         80         ▲           Czech Republic         79         ▲           Hungary         77         ▲           Slovenia         77         ▲           Slovak Republic         77         ▲           Malaysia         73         ▲           United States         73         ▲           Bulgaria         68         O           Russian Federation         67         O           Italy         66         O           International Average         65           Lithuania         64         O           Cyprus         64         O           Moldova         64         O           Latvia (LSS)         63         O           Israel         63         O           Romania         57         O           Thailand         54         ▼           Macedonia, Rep. of         51         ▼           Indonesia         47         ▼
Canada       81         Australia       81         New Zealand       81         Finland       80         Czech Republic       79         Hungary       77         Slovenia       77         Slovak Republic       77         Malaysia       73         United States       73         Bulgaria       68         Russian Federation       67         Italy       66         International Average       65         Lithuania       64         Cyprus       64         Moldova       64         Latvia (LSS)       63         Israel       63         Romania       57         Thailand       54         Macedonia, Rep. of       51         Indonesia       47         Turkey       43         Jordan       41         Tunisia       39         Iran, Islamic Rep.       36         Chile       35         Philippines       27         Morocco       20
Australia       81       ▲         New Zealand       81       ▲         Finland       80       ▲         Czech Republic       79       ▲         Hungary       77       ▲         Slovenia       77       ▲         Slovak Republic       77       ▲         Malaysia       73       ▲         United States       73       ▲         Bulgaria       68       O         Russian Federation       67       O         Italy       66       O         International Average       65         Lithuania       64       O         Cyprus       64       O         Moldova       64       O         Latvia (LSS)       63       O         Israel       63       O         Romania       57       O         Thailand       54       ▼         Macedonia, Rep. of       51       Indonesia         Turkey       43       ▼         Jordan       41       ▼         Tunisia       39       ▼         Iran, Islamic Rep.       36       ▼         Philippines
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Finland         80         ▲           Czech Republic         79         ▲           Hungary         77         ▲           Slovak Republic         77         ▲           Malaysia         73         ▲           United States         73         ▲           Bulgaria         68         O           Russian Federation         67         O           Italy         66         O           International Average         65           Lithuania         64         O           Cyprus         64         O           Moldova         64         O           Latvia (LSS)         63         O           Israel         63         O           Romania         57         O           Thailand         54         ▼           Macedonia, Rep. of         51         ▼           Indonesia         47         ▼           Turkey         43         ▼           Jordan         41         ▼           Tunisia         39         ▼           Iran, Islamic Rep.         36         ▼           Chile         35         ▼
Czech Republic       79         Hungary       77         Slovenia       77         A       Nalaysia         United States       73         Bulgaria       68         Russian Federation       67         Italy       66         International Average       65         Lithuania       64         Cyprus       64         Moldova       64         Latvia (LSS)       63         Israel       63         Romania       57         Thailand       54         Macedonia, Rep. of       51         Indonesia       47         Turkey       43         Jordan       41         Tunisia       39         Iran, Islamic Rep.       36         Chile       35         Philippines       27         Morocco       20
Hungary 77
Slovenia       77         Slovak Republic       77         Malaysia       73         United States       73         Bulgaria       68         Russian Federation       67         Italy       66         O       International Average         Eithuania       64         Cyprus       64         Moldova       64         Latvia (LSS)       63         Israel       63         Romania       57         Thailand       54         Macedonia, Rep. of       51         Indonesia       47         Turkey       43         Jordan       41         Tunisia       39         Iran, Islamic Rep.       36         Chile       35         Philippines       27         Morocco       20
Slovenia       77         Slovak Republic       77         Malaysia       73         United States       73         Bulgaria       68         Russian Federation       67         Italy       66         O       International Average         Eithuania       64         Cyprus       64         Moldova       64         Latvia (LSS)       63         Israel       63         Romania       57         Thailand       54         Macedonia, Rep. of       51         Indonesia       47         Turkey       43         Jordan       41         Tunisia       39         Iran, Islamic Rep.       36         Chile       35         Philippines       27         Morocco       20
Malaysia 73 A United States 73 A Bulgaria 68 O Russian Federation 67 O Italy 66 O  International Average 65 Lithuania 64 O Cyprus 64 O Moldova 64 O Latvia (LSS) 63 O Israel 63 O Romania 57 O Thailand 54 ▼ Macedonia, Rep. of 51 Indonesia 47 ▼ Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20
Malaysia 73 A United States 73 A Bulgaria 68 O Russian Federation 67 O Italy 66 O  International Average 65 Lithuania 64 O Cyprus 64 O Moldova 64 O Latvia (LSS) 63 O Israel 63 O Romania 57 O Thailand 54 ▼ Macedonia, Rep. of 51 Indonesia 47 ▼ Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20
United States 73 Bulgaria 68 Russian Federation 67 Italy 66 O International Average 65 Lithuania 64 Cyprus 64 Moldova 64 Latvia (LSS) 63 Israel 63 Romania 57 Thailand 54 Macedonia, Rep. of 51 Indonesia 47 Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20
Russian Federation 67 O Italy 66 O International Average 65 Lithuania 64 O Cyprus 64 O Moldova 64 O Latvia (LSS) 63 O Israel 63 Romania 57 O Thailand 54 V Macedonia, Rep. of 51 Indonesia 47 Turkey 43 Jordan 41 Tunisia 39 Iran, Islamic Rep. 36 Chile 35 Philippines 27 Morocco 20 V
Italy         66         O           International Average         65           Lithuania         64         O           Cyprus         64         O           Moldova         64         O           Latvia (LSS)         63         O           Israel         63         O           Romania         57         O           Thailand         54         Y           Macedonia, Rep. of         51         Y           Indonesia         47         Y           Turkey         43         Y           Jordan         41         Y           Tunisia         39         Y           Iran, Islamic Rep.         36         Y           Chile         35         Y           Philippines         27         Y           Morocco         20         Y
International Average   65
Lithuania       64       O         Cyprus       64       O         Moldova       64       O         Latvia (LSS)       63       O         Israel       63       O         Romania       57       O         Thailand       54       ▼         Macedonia, Rep. of       51       ▼         Indonesia       47       ▼         Turkey       43       ▼         Jordan       41       ▼         Tunisia       39       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼         Philippines       27       ▼         Morocco       20       ▼
Cyprus 64 O Moldova 64 O Latvia (LSS) 63 O Israel 63 O Romania 57 O Thailand 54 V Macedonia, Rep. of 51 Indonesia 47 V Turkey 43 V Jordan 41 V Tunisia 39 V Iran, Islamic Rep. 36 V Chile 35 V Philippines 27 V Morocco 20 V
Moldova       64       O         Latvia (LSS)       63       O         Israel       63       O         Romania       57       O         Thailand       54       ▼         Macedonia, Rep. of       51       ▼         Indonesia       47       ▼         Turkey       43       ▼         Jordan       41       ▼         Tunisia       39       ▼         Iran, Islamic Rep.       36       ▼         Chile       35       ▼         Philippines       27       ▼         Morocco       20       ▼
Latvia (LSS) 63 O Israel 63 O Romania 57 O Thailand 54 ▼ Macedonia, Rep. of 51 ▼ Indonesia 47 ▼ Turkey 43 ▼ Jordan 41 ▼ Tunisia 39 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Philippines 27 ▼ Morocco 20 ▼
Israel 63 O Romania 57 O Thailand 54 ▼ Macedonia, Rep. of 51 Indonesia 47 Turkey 43 ▼ Jordan 41 ▼ Tunisia 39 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 Philippines 27 Morocco 20 ▼
Romania 57 O Thailand 54 ▼ Macedonia, Rep. of 51 ▼ Indonesia 47 ▼ Turkey 43 ▼ Jordan 41 ▼ Tunisia 39 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Philippines 27 ▼ Morocco 20 ▼
Thailand 54 ▼ Macedonia, Rep. of 51 ▼ Indonesia 47 ▼ Turkey 43 ▼ Jordan 41 ▼ Tunisia 39 ▼ Iran, Islamic Rep. 36 ▼ Chile 35 ▼ Philippines 27 ▼ Morocco 20 ▼
Macedonia, Rep. of 51 VIndonesia 47 VITUREY 43 VITUREY 43 VITURISIA 39 VITURISIA 36 VITURISIA 35
Indonesia 47 V Turkey 43 V Jordan 41 V Tunisia 39 V Iran, Islamic Rep. 36 V Chile 35 V Philippines 27 V Morocco 20 V
Indonesia 47 V Turkey 43 V Jordan 41 V Tunisia 39 V Iran, Islamic Rep. 36 V Chile 35 V Philippines 27 V Morocco 20 V
Morocco 20 ▼
South Δfrica 14 ▼
Joddi Airica 14

# Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain	
Algebra	Investigating and Solving Problems	

## Sequence of figures with circles



a) Complete the table below. First, fill in how many circles make up Figure 4. Then, find the number of circles that would be needed for the 5th figure if the sequence of figures is extended.

Figure	Number of circles
1	1
2	3
3	- 6
4	
5	

b) The sequence of figures is extended to the 7th figure. How many circles would be needed for Figure 7?

Answer	
CARRAGET	

c) The 50th figure in the sequence contains 1275 circles. Determine the number of circles in the 51st figure. Without drawing the 51st figure, explain or show how you arrived at your answer.

Item Number: V04B

## **SCORING**

B. Scoring for Number of Circles in Figure 7

## **Correct Response**

• 28

#### **Incorrect Response**

- 21
- 22
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

## **Overall Percent Correct**

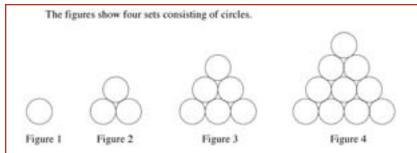
Korea, Rep. of	86	
Japan	83	
Hong Kong, SAR	83	
Singapore	82	
Chinese Taipei	81	
Canada	72	
Australia	71	
Belgium (Flemish)	70	
England	68	
Netherlands	67	
Slovak Republic	67	
Hungary	66	
Slovenia	66	
Czech Republic	64	
New Zealand	64	
Malaysia	64	_
Finland	62	_
United States	62	
Russian Federation	54	0
International Average		
international / trenag	~ ~ .	
Bulgaria	5/1	Ω
Bulgaria Cyprus	54 53	0
Cyprus	53	0
Cyprus Moldova	53 52	0
Cyprus Moldova Italy	53 52 52	0 0
Cyprus Moldova Italy Israel	53 52 52 52	0 0 0
Cyprus Moldova Italy Israel Latvia (LSS)	53 52 52 52 52 50	0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania	53 52 52 52 52 50 47	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania	53 52 52 52 52 50 47 47	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand	53 52 52 52 52 50 47 47 46	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of	53 52 52 52 52 50 47 47 46 41	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia	53 52 52 52 52 50 47 47 46 41 38	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey	53 52 52 52 52 50 47 47 46 41 38 33	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan	53 52 52 52 52 50 47 47 46 41 38 33 30	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia	53 52 52 52 52 50 47 47 46 41 38 33 30 29	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep.	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24 24	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines Morocco	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24 21 12	0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24 24	0 0 0 0 0 0

# Country average vs. International average:

Higher	
Not different	0
Lower	_

Content Domain	Cognitive Domain
Algebra	Communicating and Reasoning

## Sequence of figures with circles



a) Complete the table below. First, fill in how many circles make up Figure 4. Then, find the number of circles that would be needed for the 5th figure if the sequence of figures is extended.

Figure	Number of circles
1	1
2	3
3	6
4	
5	

b) The sequence of figures is extended to the 7th figure. How many circles would be needed for Figure 7?

Answer:

c) The 50th figure in the sequence contains 1275 circles. Determine the number of circles in the 51st figure. Without drawing the 51st figure, explain or show how you arrived at your answer.

Item Number: V04C

## **SCORING**

C. Scoring for Explanation and Answer for 51st Figure

## **Correct Response**

- 1326. Correct general expression  $\frac{n (n + 1)}{2}$ ,  $\frac{51(52)}{2}$ , or equivalent
- 1326 [Adds 1275 + 51]
- Other fully correct, including [( figure number)<sup>2</sup> number of circles in previous figure]

#### **Partial Response**

- 1326 without showing how obtained
- · Correct method but does not write 1326 as answer
- · Other partially correct

## **Incorrect Response**

• Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

## **Overall Percent Correct**

Korea, Rep. of	70	
Chinese Taipei	68	
Japan	66	
Singapore	65	
Hong Kong, SAR	57	
Netherlands	48	
Belgium (Flemish)	44	<b>A A A A</b>
Canada	43	
Australia	39	
Hungary	38	
Malaysia	37	
Slovenia	37	0
England	35	0
United States	34	
Czech Republic	34	0
Slovak Republic	31	0
New Zealand	31	0
International Average	30	
Finland	30	0
Israel	27	0
Russian Federation	27	0
Moldova	26	0
Bulgaria	26	0
Bulgaria Thailand	26 25	
3		
Thailand	25	
Thailand Italy	25 24	
Thailand Italy Indonesia	25 24 24	
Thailand Italy Indonesia Latvia (LSS)	25 24 24 22	
Thailand Italy Indonesia Latvia (LSS) Romania	25 24 24 22 19	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania	25 24 24 22 19	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus	25 24 24 22 19 19	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of	25 24 24 22 19 19 15	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of Jordan	25 24 24 22 19 19 15 13	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of Jordan Turkey	25 24 24 22 19 19 15 13 13	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of Jordan Turkey Philippines	25 24 24 22 19 19 15 13 13 11	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of Jordan Turkey Philippines Chile	25 24 24 22 19 19 15 13 13 11 9	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of Jordan Turkey Philippines Chile Tunisia	25 24 24 22 19 19 15 13 13 11 9 8	
Thailand Italy Indonesia Latvia (LSS) Romania Lithuania Cyprus Macedonia, Rep. of Jordan Turkey Philippines Chile Tunisia Iran, Islamic Rep.	25 24 24 22 19 19 15 13 13 11 9 8 8	O V

Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Measurement	Knowing

## Units to measure mass of egg

What units would be best to use to measure the weight (mass) of an egg?

- A. centimeters
- B. milliliters
- C. grams
- D. kilograms

Item Number: D11

**Correct Response:** 

C

# **Overall Percent Correct**

Japan	98	
Slovak Republic	96	
Hungary	96	
Czech Republic	95	
Korea, Rep. of	93	
Bulgaria	93	
Slovenia	93	
Singapore	93	
Belgium (Flemish)	92	
Russian Federation	92	
Australia	91	
Italy	90	
Netherlands	89	
Latvia (LSS)	89	
Malaysia	88	
Lithuania	88	
Finland	87	
Macedonia, Rep. of	87	
New Zealand	87	
Tunisia	86	
England	86	
Canada	85	
Romania	85	0
Moldova	82	O
Hong Kong, SAR	82	O
International Average	81	

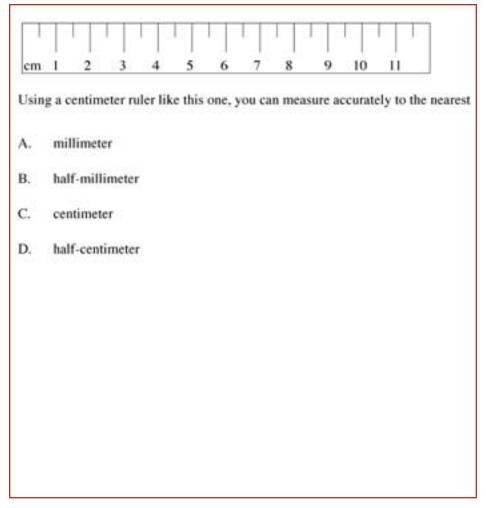
Cyprus	79	0
Turkey	78	0
Israel	75	$\blacksquare$
Chinese Taipei	73	$\blacksquare$
Jordan	73	$\blacksquare$
Thailand	69	$\blacksquare$
Chile	69	$\blacksquare$
Iran, Islamic Rep.	68	$\blacksquare$
United States	68	$\blacksquare$
Morocco	55	$\blacksquare$
South Africa	48	$\blacksquare$
Philippines	47	$\blacksquare$
Indonesia	34	$\blacksquare$

Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Measurement	Knowing

# Measurement accuracy of ruler



Item Number: F10

# **Overall Percent Correct**

Finland Belgium (Flemish) Slovenia Latvia (LSS) Russian Federation Czech Republic Netherlands Hungary Bulgaria Australia Korea, Rep. of Italy Slovak Republic Lithuania Hong Kong, SAR New Zealand Singapore Canada England	81 80 75 75 74 74 72 71 65 63 61 61 60 59 57 56 52 52 51	
International Averag		
Israel	48	O
Chinasa Tainai	47	0
Chinese Taipei	47 45	0
Romania	45	0
i		0
Romania Macedonia, Rep. of	45 43	0
Romania Macedonia, Rep. of United States	45 43 42	0
Romania Macedonia, Rep. of United States Moldova	45 43 42 41	0
Romania Macedonia, Rep. of United States Moldova Thailand	45 43 42 41 37	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia	45 43 42 41 37 35	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan	45 43 42 41 37 35 35	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile	45 43 42 41 37 35 35 33	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia	45 43 42 41 37 35 35 33 29 29 27	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus	45 43 42 41 37 35 35 33 29 29 27 24	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep.	45 43 42 41 37 35 35 33 29 29 27 24 23	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep. Jordan	45 43 42 41 37 35 35 33 29 29 27 24 23 23	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep. Jordan Morocco	45 43 42 41 37 35 35 33 29 29 27 24 23 23 20	0
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep. Jordan	45 43 42 41 37 35 35 33 29 29 27 24 23 23	

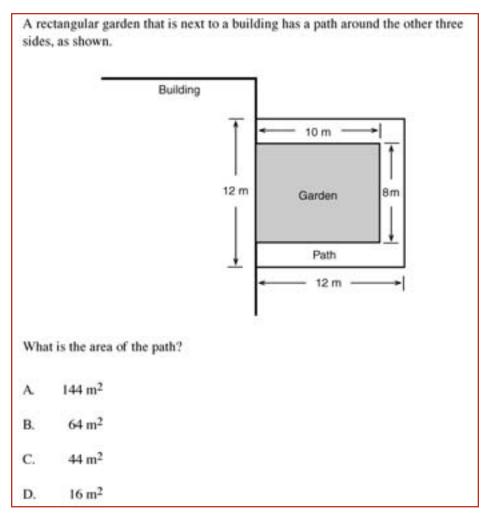
Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

## Area of path around garden



Item Number: J10

# **Overall Percent Correct**

Hong Kong, SAR Singapore Japan Chinese Taipei Korea, Rep. of Netherlands Australia Malaysia Slovak Republic Canada Belgium (Flemish) Finland Hungary Slovenia Cyprus Italy	79 78 74 73 67 57 52 51 51 46 46 45 45	
Bulgaria	42	0
International Average		
Czech Republic	40	Ο
England	40	Ο
New Zealand	40	0
Tunisia	38	0
Russian Federation	38	0
Thailand	35	0
Moldova	34	0
United States	33	•
Morocco	31	•
Lithuania	31	•
Macedonia, Rep. of	30	•
Romania	29	•
Jordan	29	•
Israel	28	•
Latvia (LSS)	28	•
Iran, Islamic Rep.	26	•
Indonesia	25	* * * * * * * * * * * * * * * * * * *
Turkey	22	•
Chile	18	•
Philippines	15	•
South Africa	15	▼

# Country average vs. International average:

	_
Higher	
Not different	0
Lower	_

**Correct Response:** 

В

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

## Most paces to walk to end of hallway

Four girls measured the length of their paces. The chart shows their measurements.

Name	Length of Pace
Polly	80 cm
Maria	65 cm
Helen	75 cm
Susan	60 cm

Who would take the most paces in walking from one end of a hallway to the other?

- A. Polly
- B. Maria
- C. Helen
- D. Susan

Item Number: L13

## **Overall Percent Correct**

Belgium (Flemish)	94	<b>A</b>
Hungary	91	<b>A</b>
Finland	90	<b>A</b>
Netherlands	90	<b>A</b>
Japan	86	<b>A</b>
Lithuania	84	<b>A A A A</b>
Latvia (LSS)	81	<b>A</b>
Chinese Taipei	81	<b>A</b>
Czech Republic	81	<b>A</b>
Slovak Republic	81	<b>A</b>
Chile	81	<b>A</b>
Australia	79	<b>A</b>
Slovenia	79	<b>A</b>
Russian Federation	77	<b>A A A</b>
Canada	76	<b>A</b>
Italy	75	<b>A</b>
Jordan	75	<b>A</b>
Hong Kong, SAR	75	
England	74	0
Korea, Rep. of	72	0
Cyprus	70	0
Romania	68	Ο
New Zealand	68	0
International Averag	je 67	
Tunisia	67	0
Israel	67	0
Moldova	66	0
Bulgaria	65	0
Singapore	62	0
United States	57	○ ▼
Macedonia, Rep. of	56	▼

Country average vs.
International average:
Higher
Not different
Lower

Thailand

Malaysia

Turkey

Indonesia

Morocco

Philippines

South Africa

Iran, Islamic Rep.

•

•

•

•

•

50

48

45 27

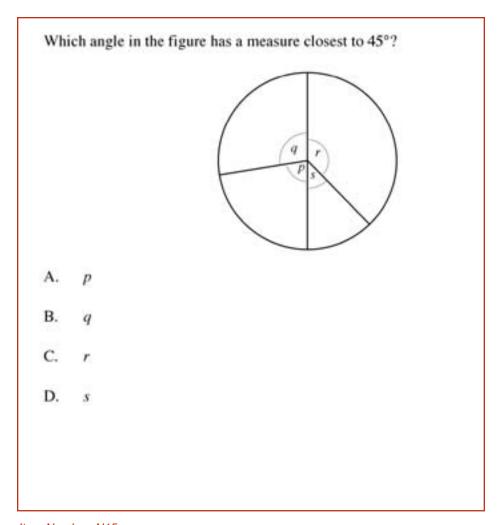
23

20

Correct Response:

Content Domain	Cognitive Domain
Measurement	Knowing

## Angle closest to 45 degrees



Item Number: N15

# **Overall Percent Correct**

Japan	81	<b>A</b>
Korea, Rep. of	81	<b>A</b>
Chinese Taipei	79	<b>A</b>
Slovak Republic	76	<b>A</b>
Canada	73	<b>A</b>
Finland	73	<b>A</b>
Russian Federation	73	<b>A</b>
Hong Kong, SAR	73	<b>A</b>
Singapore	72	<b>A A A</b>
Hungary	72	<b>A</b>
Belgium (Flemish)	70	<b>A</b>
Latvia (LSS)	70	<b>A</b>
Australia	68	0
Thailand	64	0
Malaysia	63	0
Romania	62	0
Iran, Islamic Rep.	61	0
Czech Republic	61	0
Bulgaria	61	0
England	61	0
England	01	U
Slovenia	61	0
3	61	
Slovenia	61	
Slovenia International Average	61 e <b>60</b>	0
Slovenia International Average Macedonia, Rep. of	61 <b>60</b>	0
Slovenia International Average Macedonia, Rep. of Moldova	61 <b>60</b> 60 58	0 0
Slovenia International Average Macedonia, Rep. of Moldova Lithuania	61 60 60 58 58	0 0 0
Slovenia International Average Macedonia, Rep. of Moldova Lithuania Cyprus	61 60 58 58 56	0 0 0 0
Slovenia International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand	61 <b>60</b> 58 58 56 56	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia	61 60 60 58 58 56 56 53	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands	61 60 58 58 56 56 53 52	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia	61 60 58 58 56 56 56 53 52 51	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel	61 60 60 58 58 56 56 56 53 52 51	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States	61 60 60 58 58 56 56 53 52 51 51	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy	61 60 60 58 58 56 56 53 52 51 51 51	0 0 0 0 0 0
Slovenia  International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile	61 60 60 58 58 56 56 53 52 51 51 51 48	0 0 0 0 0 0
Slovenia International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile Turkey	61 60 60 58 58 56 56 53 52 51 51 51 48 45	0 0 0 0 0 0
Slovenia International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile Turkey Jordan	61 60 60 58 58 56 56 53 52 51 51 51 48 45 45	0 0 0 0 0 0
Slovenia International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile Turkey Jordan Morocco	61 60 60 58 58 56 56 53 52 51 51 51 48 45 45 39	0 0 0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

# Ratio of width/perimeter in rectangle

		Γ			
Wha	at is the ratio	of the w	vidth of the	e rectangle	to its perimeter
Α.	$\frac{1}{2}$				
	10.00				
3.	1/3				
в.					

Item Number: P08

# **Overall Percent Correct**

Singapore	56	
Chinese Taipei	53	<b>A A A A A</b>
Hong Kong, SAR	45	
Japan	44	
Italy	32	
Korea, Rep. of	30	
Belgium (Flemish)	29	
Romania	28	0
Russian Federation	26	0
Bulgaria	25	0
International Average	22	
Slovak Republic	21	0
Malaysia	21	Ο
Slovenia	21	0
Moldova	21	0
Jordan	20	0
Czech Republic	20	Ο
Latvia (LSS)	20	0
Lithuania	19	0
Australia	18	0
Turkey	18	0
South Africa	18	0
Tunisia	17	Ο
Indonesia	17	Ο
Cyprus	17	0
Hungary	16	Ο
New Zealand	16	0
Canada	16	•
Israel	15	•
Netherlands	15	Ο
Iran, Islamic Rep.	15	•
Chile	14	•
England	13	<ul><li> </li><li> </li><li> </li><li> </li><li> </li><li> </li><li> </li></ul>
Macedonia, Rep. of	13	▼
Morocco	12	▼
United States	11	•
Finland	11	•

Country average vs. International average:

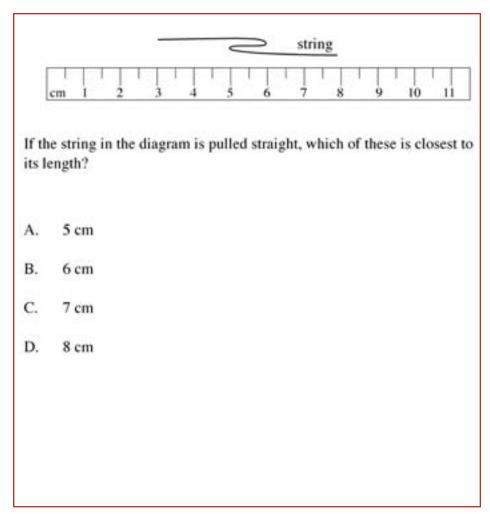
Thailand Philippines

Higher △ Not different ○ Lower ▼

**Correct Response:** 

Content Domain	Cognitive Domain
Measurement	Using Complex Procedures

## Length of string pulled straight



Item Number: P12

# **Overall Percent Correct**

1			
1 1	lungary	59	<b>A</b>
Jo	apan	57	
S	lovak Republic	57	
N	letherlands	56	
В	elgium (Flemish)	54	
Н	long Kong, SAR	53	
C	zech Republic	53	
C	hinese Taipei	53	
Li	atvia (LSS)	53	
S	ingapore	52	
А	ustralia	52	
S	lovenia	52	
Fi	inland	50	0
K	orea, Rep. of	50	
R	ussian Federation	48	0
Ν	1alaysia	46	0
C	anada	46	O
N	lew Zealand	45	O
Li	ithuania	44	O
	ngland	43	0
lr	nternational Averag	e 41	
I	hailand	4.4	_
	Hallaria	41	O
1	1oldova	40	0
N			0
N B	1oldova	40	0 0
N B U	Moldova ulgaria	40 39	0 0 0
N B U Ti	Moldova ulgaria Inited States	40 39 39	0 0 0 0
M B U Ti	Moldova ulgaria Inited States unisia	40 39 39 38 36 36	0 0 0 0 0 0
M B U Ti C	Moldova ulgaria Inited States unisia yprus	40 39 39 38 36	0 0 0 0 0 0 0 0
M B U Ti C R	Moldova ulgaria Inited States unisia iyprus omania	40 39 39 38 36 36	0 0 0 0 0
M B U Ti C R Is	Moldova ulgaria Inited States unisia iyprus omania rrael	40 39 39 38 36 36 36	0 0 0 0 0
M B U Ti C R Is	Moldova ulgaria Inited States unisia iyprus omania urael an, Islamic Rep.	40 39 39 38 36 36 36 34 33	0 0 0 0 0
M B U Ti C R Is Ir	Moldova ulgaria Inited States unisia iyprus omania orael an, Islamic Rep. aly	40 39 39 38 36 36 34 33 32	0 0 0 0 0
M B U Ti C R Is Ir It	Moldova ulgaria Inited States unisia iyprus omania orael an, Islamic Rep. aly	40 39 39 38 36 36 34 33 32 32	0 0 0 0 0
MBBUUTII	Moldova ulgaria Inited States unisia typrus omania orael an, Islamic Rep. aly Macedonia, Rep. of urkey ordan hile	40 39 39 38 36 36 34 33 32 32 30	0 0 0 0 0
MBBUUTII	Moldova ulgaria Inited States unisia typrus omania arael an, Islamic Rep. aly Macedonia, Rep. of urkey ordan	40 39 39 38 36 36 34 33 32 32 30 26	0 0 0 0 0
MBBUUTiiCCRRISTIN	Moldova ulgaria Inited States unisia typrus omania orael an, Islamic Rep. aly Macedonia, Rep. of urkey ordan hile	40 39 39 38 36 36 34 33 32 32 30 26 25	0 0 0 0 0
MBBUTION CONTROL CONTR	Moldova ulgaria Inited States unisia yprus omania urael an, Islamic Rep. aly Macedonia, Rep. of urkey ordan ihile indonesia	40 39 39 38 36 36 34 33 32 32 30 26 25 23	0 0 0 0 0 0 0 0

Country average vs. International average:

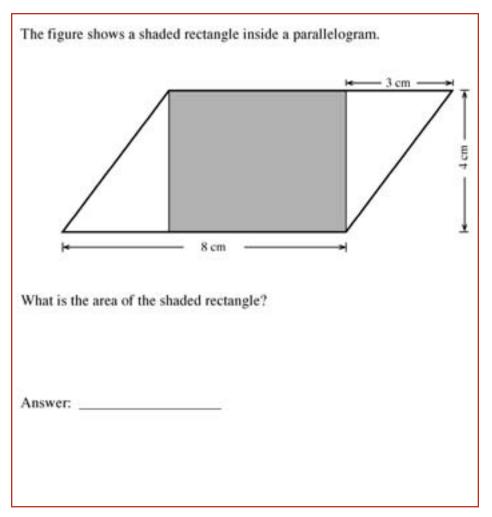
Higher
Not different
Lower

**Correct Response:** 

C

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

## Area of rectangle inside parallelogram



Item Number: T03

## **SCORING**

Note: There is no distinction made between responses with or without units.

## **Correct Response**

• 20

#### **Incorrect Response**

- 32 [4 x 8]
- 18 [perimeter]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

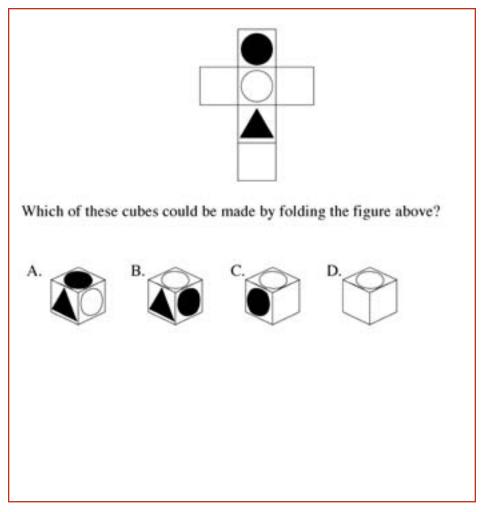
## **Overall Percent Correct**

Singapore		
	83	
Japan	80	
Hong Kong, SAR	78	
Korea, Rep. of	78	
Chinese Taipei	75	
Belgium (Flemish)	65	
Canada	58	
Slovak Republic	57	
Finland	57	
Malaysia	56	
Netherlands	55	0
Australia	55	
Bulgaria	52	O
Slovenia	49	0
Russian Federation	49	0
Italy	48	O
England	48	0
Czech Republic	46	0
Hungary	45	0
Latvia (LSS)	44	0
International Averag	je 43	
Romania	43	0
New Zealand	41	0
New Zealand Cyprus	41 41	0
		0
Cyprus	41	<ul><li>○</li><li>○</li><li>▼</li></ul>
Cyprus Moldova	41 38	0
Cyprus Moldova Tunisia	41 38 38	<ul><li>○</li><li>○</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania	41 38 38 35	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States	41 38 38 35 34	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand	41 38 38 35 34 33	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel	41 38 38 35 34 33 28	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan	41 38 38 35 34 33 28 26	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep.	41 38 38 35 34 33 28 26 25	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of	41 38 38 35 34 33 28 26 25 25	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey	41 38 38 35 34 33 28 26 25 25 20	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey Indonesia	41 38 38 35 34 33 28 26 25 25 20 20	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey Indonesia Morocco	41 38 38 35 34 33 28 26 25 25 20 20 8	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>

# Country average vs. International average:

Content Domain	Cognitive Domain
Geometry	Using Complex Procedures

## Cube from folded 2-dimensional net



Item Number: B11

# **Overall Percent Correct**

Japan	89	
Korea, Rep. of	85	<b>A</b>
Hong Kong, SAR	84	
Singapore	83	
Chinese Taipei	83	<b>A</b>
Netherlands	82	
Belgium (Flemish)	82	
Czech Republic	78	
Finland	77	<b>A</b>
Australia	75	_
Slovak Republic	74	<b>A A A A A A A</b>
Canada	74	_
Malaysia	71	
Latvia (LSS)	71	<b>A A A A</b>
New Zealand	70	_
Slovenia	68	_
Hungary	68	
United States	65	<b>A</b>
England	64	0
Bulgaria	64	0
Lithuania	60	Ο
Russian Federation	60	Ο
International Average		
Italy	55	Ο
Thailand	53	0
Chile	48	•
Israel	48	•
Moldova	47	•
Cyprus	45	•
Romania	42	•
Macedonia, Rep. of	39	•
Indonesia	38	•
Tunisia	37	• •
Turkey	34	▼
Jordan	34	▼
Iran, Islamic Rep.	28	▼
Philippines	24	•
Morocco	21	▼

# Country average vs. International average:

South Africa

Higher 
Not different 
Lower 

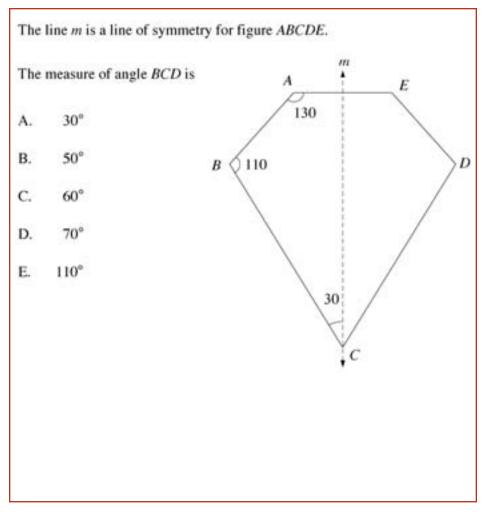
A

**Correct Response:** 

C

Content Domain	Cognitive Domain
Geometry	Investigating and Solving Problems

## Angles in symmetric polygon



Item Number: D07

# **Overall Percent Correct**

Hong Kong, SAR	82	<b>A</b>
Korea, Rep. of	82	<b>A</b>
Singapore	82	<b>A</b>
Japan	80	<b>A</b>
Bulgaria	80	<b>A</b>
Latvia (LSS)	79	
Russian Federation	79	
Tunisia	77	_ _ _
Slovak Republic	77	<b>A</b>
Chinese Taipei	74	<b>A</b>
Czech Republic	73	<b>A</b>
Canada	72	<b>A</b>
Lithuania	71	<b>A</b>
Moldova	71	<b>A</b>
Cyprus	69	<b>A</b>
Finland	69	<b>A</b>
Slovenia	66	0
Romania	66	0
Italy	65	0
Macedonia, Rep. of	65	0
Belgium (Flemish)	65	0
Netherlands	64	0
Australia	62	0
International Averag	e 62	
Malaysia	59	0
Israel	58	0
Thailand	58	0
Hungary	56	▼
New Zealand	54	▼
United States	F-2	▼
	52	
Iran, Islamic Rep.	52 50	▼
		▼ ▼
Iran, Islamic Rep.	50	▼ ▼ ▼
Iran, Islamic Rep. England	50 46	▼ ▼ ▼
Iran, Islamic Rep. England Jordan	50 46 44	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Rep. England Jordan Indonesia	50 46 44 43	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Rep. England Jordan Indonesia Morocco	50 46 44 43 36	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Rep. England Jordan Indonesia Morocco Chile	50 46 44 43 36 35	* * * * * * * * * * * * * * * * * * * *
Iran, Islamic Rep. England Jordan Indonesia Morocco Chile Turkey	50 46 44 43 36 35 35	• •

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

C

Content Domain	Cognitive Domain
Geometry	Knowing

## NOT true for all rectangles

Of the following, which is NOT true for all rectangles?

- A. The opposite sides are parallel.
- B. The opposite sides are equal.
- C. All angles are right angles.
- D. The diagonals are equal.
- E. The diagonals are perpendicular.

Item Number: J11

**Correct Response:** 

Ε

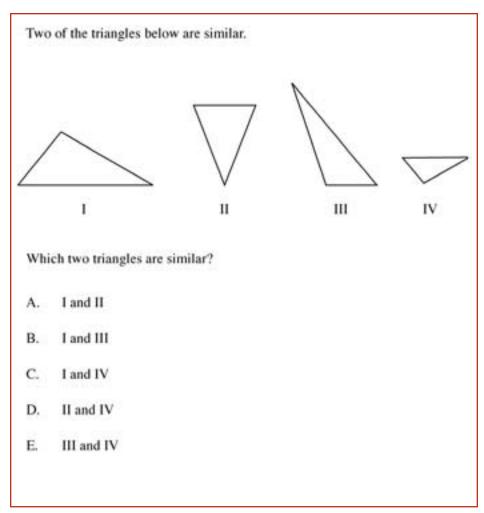
# **Overall Percent Correct**

Japan 		
	76	
Tunisia	75	
Belgium (Flemish)	74	
Korea, Rep. of	73	
Chinese Taipei	71	
Russian Federation	71	
Hungary	69	
Bulgaria	68	
Thailand	67	
Latvia (LSS)	64	<b>A</b>
Slovak Republic	64	
Slovenia	62	0
Singapore	61	0
Australia	61	0
Romania	59	0
England	58	0
Italy	56	0
Lithuania	55	0
Canada	55	0
Cyprus	54	0
Macedonia, Rep. of	54	0
International Average	54	
New Zealand	53	0
Hong Kong, SAR	53	0
Moldova	53	0
		U
Malaysia	52	O
Malaysia Jordan	52 50	0
,		O
Jordan	50	<ul><li>○</li><li>▼</li><li>○</li></ul>
Jordan United States	50 46	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep.	50 46 46	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands	50 46 46 42	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey	50 46 46 42 42	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel	50 46 46 42 42 39	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland	50 46 46 42 42 39 38	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile	50 46 46 42 42 39 38 36	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile Indonesia	50 46 46 42 42 42 39 38 36 34	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile Indonesia Philippines	50 46 46 42 42 39 38 36 34 29	0 0 <b>v</b> 0
Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile Indonesia Philippines Czech Republic	50 46 46 42 42 39 38 36 34 29 28	<ul><li>○</li><li>▼</li><li>○</li></ul>

Country average vs. International average:

Content Domain	Cognitive Domain
Geometry	Knowing

# Two similar triangles



Item Number: J15

## **Overall Percent Correct**

Japan	84	<b>A</b>
Korea, Rep. of	82	
Singapore	76	
Malaysia	74	
Chinese Taipei	74	
Bulgaria	74	
Russian Federation	71	
Slovak Republic	70	O
Lithuania	69	0
Thailand	69	<b>A</b>
Macedonia, Rep. of	68	O
Moldova	68	O
Latvia (LSS)	68	0
Hungary	67	O
Belgium (Flemish)	66	0
Australia	66	0
Slovenia	66	0
Romania	66	0
Czech Republic	66	0
Canada	65	0
Italy	65	0
Hong Kong, SAR	65	O
Finland	63	0
Netherlands	62	0
United States	62	O
International Average	62	
Iran Islamic Ren	61	$\cap$

Iran, Islamic Rep.	61	0
England	60	0
New Zealand	57	0
Cyprus	55	O
Jordan	53	$\blacksquare$
Turkey	52	$\blacksquare$
Tunisia	48	$\blacksquare$
Morocco	46	$\blacksquare$
Chile	46	$\blacksquare$
Indonesia	44	$\blacksquare$
Israel	42	$\blacksquare$
Philippines	41	$\blacksquare$
South Africa	29	$\blacksquare$

Country average vs. International average:

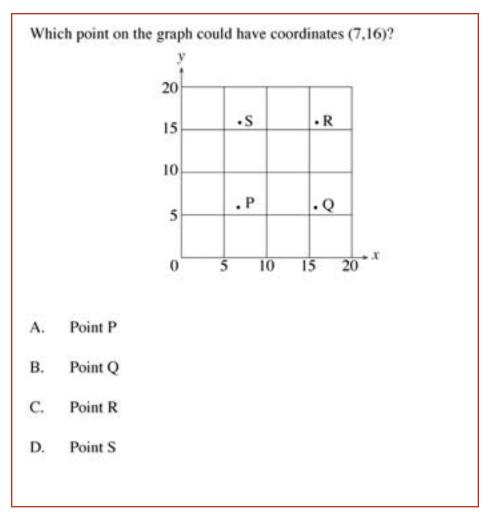
Higher
Not different
Lower

**Correct Response:** 

C

Content Domain	Cognitive Domain
Geometry	Using Routine Procedures

# Point on graph from coordinates



Item Number: J16

# **Overall Percent Correct**

Japan Korea, Rep. of	84	
Kulea, Kep. Ul	84	
Chinese Taipei	83	
Hong Kong, SAR	81	
Singapore	80	
Netherlands	78	
Malaysia	78	
Slovenia	76	
Slovak Republic	76	
England	75	
Australia	74	
Finland	72	
New Zealand	72	
Hungary	71	
Russian Federation	71	
Belgium (Flemish)	71	
Canada	67	
United States	67	
Lithuania	63	0
Italy	62	0
Czech Republic	58	0
International Average	e <b>58</b>	
1 1	57	_
Jordan		O
Iran, Islamic Rep.	55	0
	55 53	0
Iran, Islamic Rep. Bulgaria Israel	55 53 51	0
Iran, Islamic Rep. Bulgaria Israel Indonesia	55 53	0
Iran, Islamic Rep. Bulgaria Israel	55 53 51 50 48	0
Iran, Islamic Rep. Bulgaria Israel Indonesia	55 53 51 50	0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova	55 53 51 50 48	0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania	55 53 51 50 48 47	0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS)	55 53 51 50 48 47 46 44 37	0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of	55 53 51 50 48 47 46 44	0 0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of Thailand Turkey Morocco	55 53 51 50 48 47 46 44 37 32 26	0 0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of Thailand Turkey Morocco Cyprus	55 53 51 50 48 47 46 44 37 32 26 24	0 0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of Thailand Turkey Morocco Cyprus Philippines	55 53 51 50 48 47 46 44 37 32 26	0 0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of Thailand Turkey Morocco Cyprus Philippines Chile	55 53 51 50 48 47 46 44 37 32 26 24 23 23	0 0
Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of Thailand Turkey Morocco Cyprus Philippines	55 53 51 50 48 47 46 44 37 32 26 24 23	0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

Content Domain	Cognitive Domain
Geometry	Investigating and Solving Problems

# Measure of angle in quadrilateral

In a quadrilateral, each of two angles has a measure of 115°. If the measure of a third angle is 70°, what is the measure of the remaining angle?

A. 60°

B. 70°

C. 130°

D. 140°

E. None of the above

Item Number: L16

# **Overall Percent Correct**

Japan Belgium (Flemish) Singapore Chinese Taipei Hong Kong, SAR Korea, Rep. of Finland Slovenia Bulgaria Malaysia Russian Federation Slovak Republic Romania England Italy Moldova Czech Republic	73 70 67 61 60 56 53 53 49 49 49 49 48 43 41 40 40	▲
International Average		
Hungary	39	0
Netherlands	39	0
Latvia (LSS)	39	0
Tunisia	38	0
Australia	36	0
Macedonia, Rep. of	36	0
Canada	36	O
Lithuania	35	Ο
Jordan	35	0
Israel	35	0
Cyprus	30	0
Turkey	29	•
New Zealand	27	•
Morocco	26	•
Iran, Islamic Rep.	23	•
Chile	23	•
Thailand	22	* * * * * * * * * * * * * * * * * * *
Indonesia	22	•
United States	19	•
South Africa	15	•
Philippines	13	•

# Country average vs. International average:

Higher 
Not different 
Lower 

A

**Correct Response:** 

Α

Content Domain	Cognitive Domain
Geometry	Using Routine Procedures

## Position of point on number line

Point P (not shown) on the number line is 5 units from point N and 2 units from point M.



Where is point P located?

- A. Between O and L
- B. Between L and M
- C. Between M and N
- D. To the right of N

Item Number: N12

## **Overall Percent Correct**

Korea, Rep. of		
Rolea, Rep. of	67	
Netherlands	67	
Japan	66	
Belgium (Flemish)	65	
Hong Kong, SAR	63	
Russian Federation	60	
Chinese Taipei	56	
Hungary	51	
Finland	51	0
Canada	50	
Australia	50	0
Singapore	50	0
Slovak Republic	48	0
New Zealand	47	0
Slovenia	46	0
Thailand	46	0
Czech Republic	46	0
Tunisia	44	0
International Averag	e 42	
United States	42	0
Malaysia	42	0
Bulgaria	40	O
Duigaria	40	_
Lithuania	39	0
3		0
Lithuania	39	0 0
Lithuania Moldova	39 39	0 0
Lithuania Moldova Cyprus	39 39 38	0 0
Lithuania Moldova Cyprus England	39 39 38 36	0 0
Lithuania Moldova Cyprus England Italy	39 39 38 36 34	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel	39 39 38 36 34 34	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS)	39 39 38 36 34 34 32	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel	39 39 38 36 34 34 32 32	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of	39 39 38 36 34 34 32 32 31 31 30	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of Chile	39 39 38 36 34 34 32 32 31 31	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of Chile Romania	39 39 38 36 34 34 32 32 31 31 30	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of Chile Romania Iran, Islamic Rep. Turkey Philippines	39 39 38 36 34 34 32 32 31 31 30 27	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of Chile Romania Iran, Islamic Rep. Turkey	39 39 38 36 34 34 32 32 31 31 30 27 27 26 23	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of Chile Romania Iran, Islamic Rep. Turkey Philippines	39 39 38 36 34 34 32 32 31 31 30 27 27 26	0 0
Lithuania Moldova Cyprus England Italy Indonesia Latvia (LSS) Israel Macedonia, Rep. of Chile Romania Iran, Islamic Rep. Turkey Philippines South Africa	39 39 38 36 34 34 32 32 31 31 30 27 27 26 23	0

Country average vs. International average:

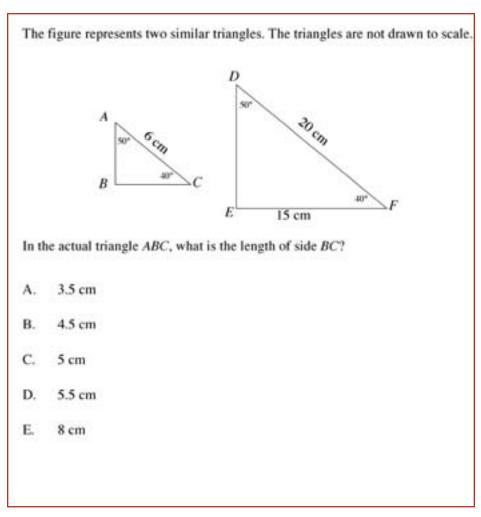
Higher △ Not different ○ Lower ▼

**Correct Response:** 

Α

Content Domain	Cognitive Domain
Geometry	Using Routine Procedures

## Length of side from similar triangle



Item Number: P10

### **Overall Percent Correct**

Korea, Rep. of	70	<b>A</b>
Japan	68	
Singapore	64	
Hong Kong, SAR	56	<b>A</b>
Chinese Taipei	52	
Belgium (Flemish)	50	
Netherlands	44	0
Hungary	43	0
Russian Federation	41	0
Finland	39	0
Australia	39	0
Romania	38	0
Slovak Republic	38	0
International Averag	e 37	
United States	36	0
Moldova	36	0
Canada	35	0
New Zealand	34	0
Slovenia	34	0
England	34	0
Bulgaria	33	0
Czech Republic	32	0
Malaysia	32	0
Jordan	32	0
Lithuania	31	0
Cyprus	31	0
Latvia (LSS)	30	0
Thailand	30	$\blacksquare$
Italy	29	$\blacksquare$
Israel	29	0
Macedonia, Rep. of	27	$\blacksquare$
Philippines	27	$\blacksquare$
Indonesia	26	$\blacksquare$
Iran, Islamic Rep.	26	$\blacksquare$
Tunisia	24	V O V
Chile	23	$\blacksquare$
South Africa	23	$\blacksquare$
Turkey	22	$\blacksquare$

Country average vs. International average:

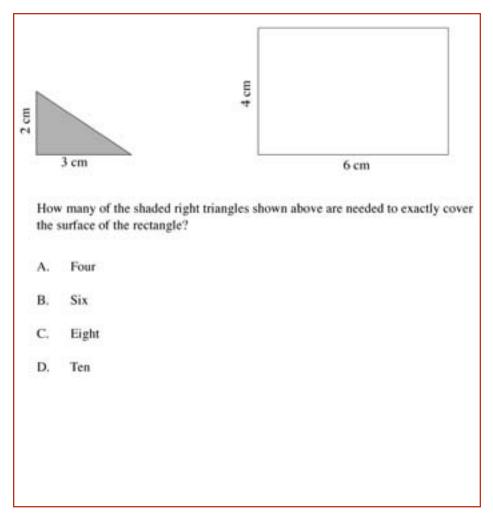
Higher
Not different
Lower

**Correct Response:** 

В

Content Domain	Cognitive Domain
Geometry	Using Complex Procedures

## Right triangles to cover rectangle



Item Number: R11

### **Overall Percent Correct**

Japan	80	<b>A</b>
Korea, Rep. of	76	
Hong Kong, SAR	75	
Singapore	72	
Belgium (Flemish)	68	
Netherlands	66	
Malaysia	60	
Chinese Taipei	60	
Hungary	59	
Slovenia	57	
Slovak Republic	57	
Australia	56	
Czech Republic	55	0
New Zealand	55	
Canada	50	0
Finland	49	0
Italy	49	0
England	48	0
Latvia (LSS)	48	0
United States	47	0
International Average	e 46	
International Average Russian Federation	44	0
		0
Russian Federation	44	_
Russian Federation Lithuania	44 43	0 0
Russian Federation Lithuania Iran, Islamic Rep.	44 43 42	0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel	44 43 42 41	0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand	44 43 42 41 40	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus	44 43 42 41 40 37	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova	44 43 42 41 40 37 37	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania	44 43 42 41 40 37 37 35	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria	44 43 42 41 40 37 37 35 34	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia	44 43 42 41 40 37 37 35 34	0 0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey	44 43 42 41 40 37 37 35 34 33	0 0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of	44 43 42 41 40 37 37 35 34 33 30 30	0 0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia	44 43 42 41 40 37 37 35 34 33 30 29	0 0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia Chile	44 43 42 41 40 37 37 35 34 33 30 29 27	0 0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia Chile Jordan Morocco Philippines	44 43 42 41 40 37 35 34 33 30 29 27 26 21 15	0 0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia Chile Jordan Morocco	44 43 42 41 40 37 35 34 33 30 30 29 27 26 21	0 0 0

Country average vs. International average:

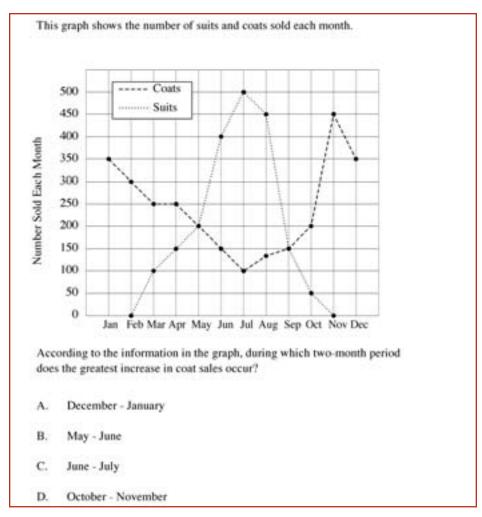
Higher △
Not different ○
Lower ▼

**Correct Response:** 

C

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

#### Graph showing greatest increase



Item Number: B07

### **Overall Percent Correct**

Japan	92	<b>A</b>
Korea, Rep. of	90	
Singapore	85	<b>A</b>
Hong Kong, SAR	83	
Netherlands	82	
Finland	81	
Chinese Taipei	79	<b>A A A A</b>
Slovenia	77	
Australia	76	
Canada	75	
England	74	
United States	73	
New Zealand	72	
Hungary	72	
Belgium (Flemish)	71	<b>A A A A</b>
Russian Federation	70	
Malaysia	68	
Slovak Republic	65	0
Lithuania	62	0
Latvia (LSS)	62	0
Israel	62	0
Italy	61	0
International Average	60	
Czech Republic	58	0
Bulgaria	55	0
Thailand	55	$\blacksquare$
Macedonia, Rep. of	52	$\blacksquare$
Turkey	42	$\blacksquare$
Indonesia	42	$\blacksquare$
Cyprus	40	$\blacksquare$
Chile	39	$\blacksquare$
Jordan	38	$\blacksquare$
Romania	36	$\blacksquare$
Philippines	36	$\blacksquare$
Tunisia	35	* * * * * * * * * * * * *
Moldova	30	$\blacksquare$
South Africa	23	$\blacksquare$
Morocco	22	$\blacksquare$

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

D

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Knowing

#### Likely result of fifth coin toss

If a fair coin is tossed, the probability that it will land heads up is  $\frac{1}{2}$ . In four successive tosses, a fair coin lands heads up each time. What is likely to happen when the coin is tossed a fifth time?

- A. It is more likely to land tails up than heads up.
- B. It is more likely to land heads up than tails up.
- C. It is equally likely to land heads up or tails up.
- D. More information is needed to answer the question.

Item Number: F08

### **Overall Percent Correct**

Hungary	86	
England	81	
Netherlands	79	
Czech Republic	77	
Chinese Taipei	77	
Australia	76	
Latvia (LSS)	75	
Canada	75	
Belgium (Flemish)	74	
Finland	71	
New Zealand	71	
Bulgaria	70	
Slovenia	70	
Lithuania	70	
Italy	70	
Slovak Republic	70	<b>A A A A</b>
Korea, Rep. of	65	
Russian Federation	63	0
United States	62	
Cyprus	60	0
Japan	58	0
International Averag	e 57	
Jordan	57	0
Chile	56	0
Hong Kong, SAR	55	0
Israel	55	0
Romania	53	0
Turkey	52	0
Macedonia, Rep. of	50	$\blacksquare$
Singapore	48	$\blacksquare$
Moldova	36	•
South Africa	34	$\blacksquare$
Iran, Islamic Rep.	33	O V
Philippines	29	•
Indonesia	28	•
Tunisia	27	•

Country average vs. International average:

24

Morocco

Malaysia Thailand

Higher 
Not different 
Lower 

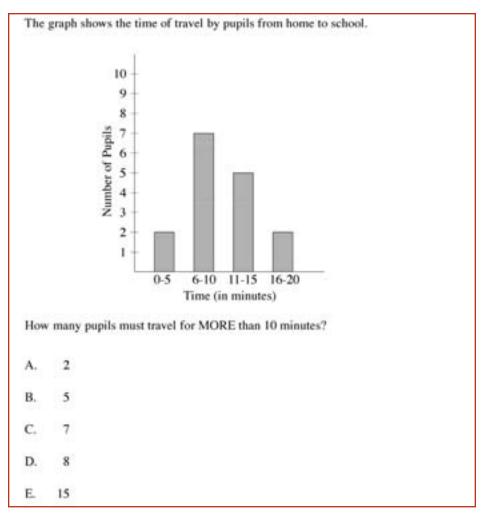
A

**Correct Response:** 

C

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

### Barchart histogram of travel time



Item Number: H07

### **Overall Percent Correct**

Korea, Rep. of	93	<b>A</b>
Hong Kong, SAR	91	
Singapore	91	
Japan	84	
England	83	<b>A</b>
Chinese Taipei	82	
Netherlands	82	
Belgium (Flemish)	82	<b>A</b>
Australia	79	
New Zealand	79	
Finland	78	
Canada	78	
Slovenia	77	<b>A</b>
United States	77	
Thailand	72	<b>A</b>
Czech Republic	70	0
Hungary	69	0
Slovak Republic	65	0
International Average	64	
Latvia (LSS)	61	O
Moldova	60	O
Italy	59	Ο
Israel	59	$\blacksquare$
Russian Federation	59	O ▼
Cyprus	58	
Lithuania	58	O
Indonesia	52	
Tunisia	51	
Philippines	51	
Jordan	50	
Turkey	49	
Romania	47	
Chile	46	
Malaysia	46	
Macedonia, Rep. of	45	
Iran, Islamic Rep.	38	O V
Morocco	36	$\blacksquare$
South Africa		
	21	•

Country average vs. International average:

Higher △
Not different ○
Lower ▼

**Correct Response:** 

C

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Investigating and Solving Problems

### Defective bulbs from random sample

From a batch of 3,000 light bulbs, 100 were selected at random and tested. If 5 of the light bulbs in the sample were found to be defective, about how many defective light bulbs would be expected in the entire batch?
A. 15
B. 60
C. 150
D. 300
E. 600

Item Number: H11

Correct Response:

C

# Overall Percent Correct

Netherlands	86	<b>A</b>
Hong Kong, SAR	85	
Chinese Taipei	83	
Singapore	83	
Korea, Rep. of	83	
Belgium (Flemish)	79	
Hungary	75	
Czech Republic	75	
Japan .	73	
Slovenia	71	
Malaysia	71	
Slovak Republic	70	
Latvia (LSS)	70	
Finland	68	0
Canada	67	0
Russian Federation	65	0
Bulgaria	65	0
Cyprus	64	0
Australia	64	0
Thailand	64	0
International Average	e <b>62</b>	
International Average England	<b>62</b> 59	0
		0
England	59	_
England Tunisia	59 59	0
England Tunisia United States	59 59 58	0
England Tunisia United States Romania	59 59 58 56	0 0
England Tunisia United States Romania Italy	59 59 58 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand	59 59 58 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania	59 59 58 56 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey	59 59 58 56 56 56 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of	59 59 58 56 56 56 56 56 54	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova	59 59 58 56 56 56 56 54 54	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel	59 59 58 56 56 56 56 54 54 53	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia	59 59 58 56 56 56 54 54 53 52	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep.	59 59 58 56 56 56 54 54 53 52 49	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep. Chile	59 58 56 56 56 56 54 54 53 52 49 47	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep. Chile Jordan	59 58 56 56 56 54 54 53 52 49 47 46 44	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep. Chile Jordan Philippines	59 58 56 56 56 54 54 53 52 49 47 46 44 36	0 0 0 0 0

Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

#### Interpretation of pictograph of houses

represent?

Item Number: J13

How many houses does one

#### **SCORING**

Answer:

#### **Correct Response**

• 6 houses

#### **Incorrect Response**

- One house
- 5 houses
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

### **Overall Percent Correct**

Singapore	95	<b>A</b>
Japan	93	
Hong Kong, SAR	93	
Korea, Rep. of	89	
Netherlands	88	
Chinese Taipei	88	
Canada	88	
Australia	86	
Finland	86	
Malaysia	85	
England	82	
United States	82	
New Zealand	82	
Slovenia	81	
Belgium (Flemish)	80	
Slovak Republic	79	
Latvia (LSS)	79	
Lithuania	78	0
Thailand	77	
Czech Republic	76	0
Italy	74	0
Russian Federation	73	0
International Average	e 69	
Cyprus	67	0
Romania	63	0
Turkey	62	$\blacksquare$
Hungary	61	0
Israel	61	O
Bulgaria	58	$\blacksquare$
Iran, Islamic Rep.	57	$\blacksquare$
Tunisia	55	$\blacksquare$
Macedonia, Rep. of	54	$\blacksquare$
Chile	53	$\blacksquare$
Moldova	52	$\blacksquare$
Jordan	42	$\blacksquare$
Philippines	36	$\blacksquare$
Indonesia	31	* * * * * * * * * * * * * * * * * * *
Morocco	23	$\blacksquare$

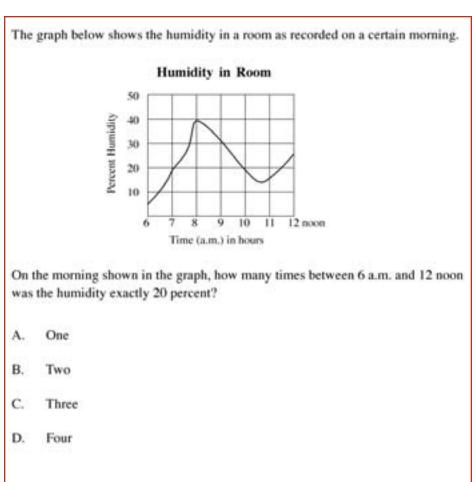
# Country average vs. International average:

South Africa

Higher
Not different
Lower

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

### Graph of humidity in room



Item Number: L11

### **Overall Percent Correct**

Finland	79	<b>A</b>
Japan	76	<b>A</b>
Netherlands	76	<b>A</b>
Chinese Taipei	73	<b>A</b>
Australia	72	<b>A</b>
Belgium (Flemish)	72	<b>A</b>
Hungary	69	<b>A</b>
Korea, Rep. of	68	<b>A</b>
Singapore	68	<b>A</b>
Canada	68	<b>A</b>
England	68	<b>A</b>
Hong Kong, SAR	68	<b>A</b>
Slovak Republic	66	<b>A</b>
Latvia (LSS)	65	0
Bulgaria	64	0
Lithuania	64	0
United States	63	<b>A</b>
Czech Republic	63	0
Russian Federation	63	0
New Zealand	62	0
Malaysia	61	0
Israel	60	0
Tunisia	58	0
International Averag	e 58	
Cyprus	57	0
Iran, Islamic Rep.	51	▼
Turkey	49	▼
Slovenia	47	▼
Chile	46	▼
Thailand	44	▼
Jordan	43	▼
Macedonia, Rep. of	43	* * * * * * * * * * * * * * * * * * *
Romania	41	▼
Moldova	39	▼
Philippines	34	▼
Morocco	31	▼
Indonesia	30	▼
South Africa	29	▼

Country average vs. International average:

Higher
Not different
Lower

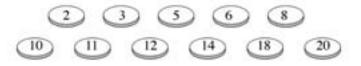
**Correct Response:** 

C

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Investigating and Solving Problems

### Probability of drawing chip

The eleven chips shown below are placed in a bag and mixed.



Chelsea draws one chip from the bag without looking. What is the probability that Chelsea draws a chip with a number that is a multiple of three?

- A.  $\frac{1}{11}$
- B.  $\frac{1}{3}$
- C.  $\frac{4}{11}$
- D. 4

Item Number: N18

### **Overall Percent Correct**

Korea, Rep. of	92	
Belgium (Flemish)	82	<b>A</b>
Japan	77	
United States	77	<b>A A A</b>
Canada	74	
England	73	
Australia	73	
Chinese Taipei	71	<b>A A A</b>
Finland	66	
Hong Kong, SAR	65	
Netherlands	64	
Singapore	64	
Italy	61	
New Zealand	60	
Hungary	53	0
Slovenia	51	0
Cyprus	51	0
Czech Republic	49	0
Israel	49	0
International Averag	e 48	
Slovak Republic	48	0
Slovak Republic Bulgaria	48 46	0
Bulgaria Turkey		0
Bulgaria Turkey Malaysia	46 43 42	0
Bulgaria Turkey	46 43	0
Bulgaria Turkey Malaysia Indonesia Jordan	46 43 42 39 38	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation	46 43 42 39	0
Bulgaria Turkey Malaysia Indonesia Jordan	46 43 42 39 38	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania	46 43 42 39 38 35 33	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile	46 43 42 39 38 35 33 32 31	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand	46 43 42 39 38 35 33	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS)	46 43 42 39 38 35 33 32 31 27 27	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of	46 43 42 39 38 35 33 32 31 27 27 25	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa	46 43 42 39 38 35 33 32 31 27 27 25 23	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines	46 43 42 39 38 35 33 32 31 27 27 25 23 23	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines Morocco	46 43 42 39 38 35 33 32 31 27 27 25 23 23 22	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines Morocco Moldova	46 43 42 39 38 35 33 32 31 27 27 25 23 23 22 22	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines Morocco Moldova Tunisia	46 43 42 39 38 35 33 32 31 27 27 25 23 23 22 22 21	0
Bulgaria Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines Morocco Moldova	46 43 42 39 38 35 33 32 31 27 27 25 23 23 22 22	0

Country average vs. International average:

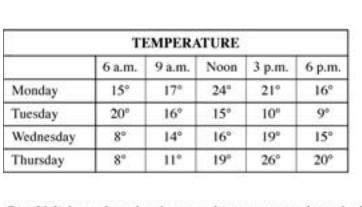
Higher △
Not different ○
Lower ▼

**Correct Response:** 

C

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

#### Day/time in table at shown temperature



This table shows temperatures at various times on four days.

35°
30°
25°
20°
10°
5°

On which day and at what time was the temperature shown in the table the same as that shown on the thermometer?

- A. Monday, Noon
- B. Tuesday, 6 a.m.
- C. Wednesday, 3 p.m.
- D. Thursday, 3 p.m.

Item Number: P16

#### **Overall Percent Correct**

Japan	96	<b>A</b>
Singapore	95	
Belgium (Flemish)	95	
Finland	93	
Korea, Rep. of	92	
England	92	
Chinese Taipei	91	
Slovenia	91	
Czech Republic	91	
Australia	91	
Slovak Republic	91	
Hong Kong, SAR	90	
Netherlands	90	
Canada	89	
United States	89	
New Zealand	88	
Hungary	87	
Cyprus	86	
Russian Federation	85	0
Malaysia	85	
Lithuania	84	0
Latvia (LSS)	83	0
Italy	81	0
International Average	e 79	

Israel	74	0
Bulgaria	72	0
Chile	67	$\blacksquare$
Moldova	66	$\blacksquare$
Romania	65	$\blacksquare$
Jordan	65	$\blacksquare$
Macedonia, Rep. of	65	$\blacksquare$
Iran, Islamic Rep.	59	$\blacksquare$
Philippines	54	$\blacksquare$
Indonesia	50	$\blacksquare$
South Africa	43	$\blacksquare$
Turkey	38	$\blacksquare$

Country average vs. International average:

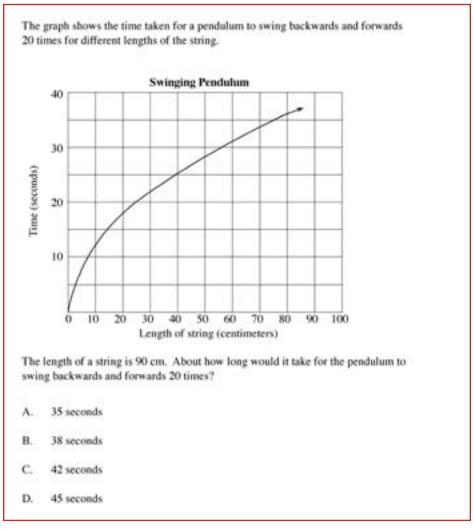
Higher
Not different
Lower

**Correct Response:** 

A

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

#### Time for pendulum to swing 20 times



Item Number: R09

### **Overall Percent Correct**

Korea, Rep. of Japan Hong Kong, SAR Singapore Netherlands Chinese Taipei England Belgium (Flemish) Finland Australia Canada Thailand Slovenia Malaysia Hungary Slovak Republic United States Russian Federation New Zealand Lithuania	78 78 71 71 70 70 68 68 67 67 66 65 63 62 62 59 59 58 58 57	
Latvia (LSS) Israel	55 55	0
International Averag	ge <b>54</b>	
Czech Republic Bulgaria Italy Cyprus Tunisia Romania Indonesia Jordan Philippines Chile Moldova Macedonia, Rep. of Morocco Turkey Iran, Islamic Rep. South Africa	53 51 48 46 43 41 40 40 37 36 36 35 35 32 31	0 0 0 0 4 4 4 4 4 4 4 4

Country average vs. International average:

Higher
Not different
Lower

**Correct Response:** 

В

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Communicating and Reasoning

#### Cheaper magazine subscription

Chris plans to order 24 issues of a magazine. He reads the following advertisements for two magazines. Ceds are the units of currency in Chris' country.

### Teen Life Magazine

24 issues First four issues FREE The rest 3 ceds each.

### Teen News Magazine

24 issues First six issues FREE The rest 3.5 ceds each.

Which magazine is the least expensive for 24 issues? How much less expensive? Show your work.

Item Number: V02

#### **SCORING**

Note: There is no distinction made between responses with or without units.

#### **Correct Response**

- Teen Life. Calculations of both magazines are correct (60 ceds for Teen Life and 63 ceds for Teen News) and correct savings of 3 ceds
- Other correct (e.g., Teen Life. Calculation of one magazine correct, the other not shown, and correct savings of 3 ceds).

#### **Partial Response**

- Correct calculations (60 and 63 ceds), but incorrect or no magazine identified and/or no difference given
- Correct calculation for Teen News (63 ceds), but incorrect calculation for Teen Life
- Incorrect calculation for Teen News but correct calculation for Teen Life (60 ceds)
- Teen Life, 3 ceds. No work shown
- $\bullet \ \, \hbox{Other partially correct response (e.g., correct calculations but incorrect difference)}\\$

#### **Incorrect Response**

• Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

#### **Overall Percent Correct**

Singapore	57	
Korea, Rep. of	52	
Chinese Taipei	50	
Belgium (Flemish)	42	
Japan	39	
Slovak Republic	36	
Slovenia	36	
Hungary	35	
Latvia (LSS)	35	
Hong Kong, SAR	34	<b>A</b>
Czech Republic	34	
Canada	32	
Russian Federation	30	0
Australia	29	0
Finland	28	0
Italy	27	0
United States	26	0
Netherlands	25	0
Lithuania	25	0
International Averag	je 24	
Bulgaria	22	0
Bulgaria Thailand	22 21	0
9		0
Thailand	21	0
Thailand Cyprus	21 21	0 0
Thailand Cyprus Romania	21 21 20	0 0
Thailand Cyprus Romania Malaysia	21 21 20 19	0 0
Thailand Cyprus Romania Malaysia Israel	21 21 20 19 19	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand	21 21 20 19 19	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova	21 20 19 19 18 17 17	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England	21 21 20 19 19 18 17	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova	21 20 19 19 18 17 17	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia	21 21 20 19 19 18 17 17 16 12 10 9	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey	21 21 20 19 19 18 17 17 16 12 10 9	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile	21 21 20 19 19 18 17 17 16 12 10 9	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep.	21 21 20 19 19 18 17 17 16 12 10 9 9 5	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile Indonesia Philippines	21 21 20 19 19 18 17 17 16 12 10 9 9 5 5	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile Indonesia Philippines Morocco	21 21 20 19 19 18 17 17 16 12 10 9 9 5 5 3	0 0
Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile Indonesia Philippines	21 21 20 19 19 18 17 17 16 12 10 9 9 5 5	0

# Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Knowing Facts and Procedures

# Value of -3x given value of x

If x = -3, what is the value of -3x?  $\bigcirc$  -9  $\bigcirc$  B) -61 E 9

Item Number: M012042

**Correct Response:** 

Ε

### **Overall Percent Correct**

Hong Kong, SAR	84	
Korea, Republic of	84	
Chinese Taipei	83	
Singapore	80	
Estonia	77	
Japan	74	
Russian Federation	73	
Hungary	69	
Israel	67	
Serbia and Montenegro	65	
United States	65	
Belgium (Flemish)	63	
Armenia	62	
Latvia	61	
Lithuania	60	
Slovak Republic	58	
Bulgaria	57	
Moldova, Republic of	54	
Netherlands	54	
Romania	51	O
Slovenia	51	O
Lebanon	49	Ο
International average	48	
Malaysia	48	0
Malaysia Macedonia, Republic of	47	Ο
Malaysia Macedonia, Republic of Iran, Islamic Republic of	47 44	O O
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines	47 44 44	<ul><li>○</li><li>▼</li></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia	47 44 44 43	<ul><li>○</li><li>▼</li><li>▼</li></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan	47 44 44 43 41	<ul><li>○</li><li>▼</li></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain	47 44 44 43 41 40	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus	47 44 44 43 41 40 38	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia	47 44 44 43 41 40 38 37	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt	47 44 44 43 41 40 38 37	0 0 * * * *
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England	47 44 44 43 41 40 38 37 37	0 0 * * * *
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy	47 44 44 43 41 40 38 37 37 37	0 0 * * * * *
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand	47 44 44 43 41 40 38 37 37 37 37	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana	47 44 43 41 40 38 37 37 37 37 35 30	0 0 * * * * *
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden	47 44 43 41 40 38 37 37 37 37 35 30 28	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia	47 44 44 43 41 40 38 37 37 37 35 30 28 26	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth.	47 44 44 43 41 40 38 37 37 37 37 35 30 28 26 25	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco	47 44 44 43 41 40 38 37 37 37 37 35 30 28 26 25 24	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland South Africa	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	O O V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	O O V

Country average vs. International average:

0

Higher Not different Lower

Norway

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Knowing Facts and Procedures

## Subtract fractions involving *x*

Subtract:  $\frac{3x}{7} - \frac{x}{7} =$ 

- $\bigcirc \qquad \frac{2}{7}$
- B 3
- © 2x
- $\bigcirc$   $\frac{x}{7}$

Item Number: M022185

**Correct Response:** 

Ε

## **Overall Percent Correct**

Korea, Republic of	86	
Hong Kong, SAR	83	<b>A</b>
Singapore	81	
Japan	76	<u> </u>
Latvia	76	<u> </u>
Chinese Taipei	76	<u> </u>
Hungary	74	
Russian Federation	67	<u> </u>
Lebanon	67	<u> </u>
Romania	65	<u> </u>
Israel	65	<u> </u>
Estonia	65	<u> </u>
Serbia and Montenegro	64	<u> </u>
Slovak Republic	63	<u> </u>
Bulgaria	63	_
Malaysia	61	_
Armenia	60	_
Belgium (Flemish)	60	<u> </u>
Cyprus	58	<u> </u>
Moldova, Republic of	58	<u> </u>
Lithuania	57	0
International average	54	
Jordan	54	0
Bahrain	49	▼
Bahrain Philippines		▼
	49	<b>▼</b>
Philippines	49 49	▼ ▼ ▼
Philippines United States	49 49 49	▼ ▼ ▼
Philippines United States Italy	49 49 49 48	<b>* * * * * *</b>
Philippines United States Italy Egypt	49 49 49 48 48	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia	49 49 49 48 48	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia	49 49 49 48 48 47	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana	49 49 49 48 48 47 47	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of	49 49 49 48 48 47 47 46 46	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth.	49 49 49 48 48 47 47 46 46 44	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia	49 49 49 48 48 47 47 46 46 44	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia	49 49 48 48 47 47 46 46 44 44	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco	49 49 48 48 47 47 46 46 44 43 43	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway	49 49 48 48 47 47 46 46 44 43 43 43	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden	49 49 48 48 47 47 46 46 44 43 43 42 41 40 39	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands	49 49 48 48 47 47 46 46 44 43 43 42 41 40	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia	49 49 48 48 47 46 46 44 43 43 42 41 40 39 39 37	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia Macedonia, Republic of	49 49 49 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia Macedonia, Republic of England	49 49 48 48 47 46 46 44 43 43 42 41 40 39 39 37 37 36	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia Macedonia, Republic of	49 49 49 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

**▲** ○ ▼

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Knowing Facts and Procedures

### Which equals 2x minus 3y plus 7x plus 5y

Which of these is equal to 2x - 3y + 7x + 5y?

- $\bigcirc \hspace{-3mm} 5x + 2y$
- $\bigcirc$  5x + 8y
- $\bigcirc$  9x + 2y
- $\bigcirc$  9x + 8y

Item Number: M032036

**Correct Response:** 

C

### **Overall Percent Correct**

Korea, Republic of	82	<b>A</b>
Japan	82	
Chinese Taipei	79	
Singapore	79	
Slovak Republic	76	
Hong Kong, SAR	74	
Hungary	74	
Estonia	72	
Belgium (Flemish)	67	
Latvia	66	
Israel	65	
Serbia and Montenegro	62	
Russian Federation	62	
Bulgaria	58	
Romania	58	
Lebanon	55	0
Slovenia	55	0
Netherlands	54	0
Lithuania	53	0
Italy	53	0
Iran, Islamic Republic of	52	0
Malaysia	51	Ο
International average	49	
International average Scotland	<b>49</b> 48	0
		0
Scotland	48	0
Scotland United States	48 47	0 0
Scotland United States Moldova, Republic of	48 47 46	0
Scotland United States Moldova, Republic of Sweden Egypt Australia	48 47 46 45	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt	48 47 46 45 45	0 0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia	48 47 46 45 45 45	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of	48 47 46 45 45 45 41 41	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway	48 47 46 45 45 45 41 41	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia	48 47 46 45 45 41 41 41 38 36	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus	48 47 46 45 45 45 41 41 41 38	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines	48 47 46 45 45 41 41 41 38 36	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England	48 47 46 45 45 41 41 41 38 36 35 33	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth.	48 47 46 45 45 41 41 41 38 36 35 33 33	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco	48 47 46 45 45 41 41 38 36 35 33 33 33	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain	48 47 46 45 45 41 41 38 36 35 33 33 33 32 27	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco	48 47 46 45 45 41 41 41 38 36 35 33 33 32 27 25	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana	48 47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana Tunisia	48 47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24	0 0 0 0
Scotland United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana	48 47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25	0 0 0 0

Country average vs. International average:

Higher Not different Lower

Indonesia

22

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Reasoning

# The value of a + 2 times (b plus c)

If $a + 2b = 5$ and $c = 3$ , what is the value of $a + 2(b + c)$ ?		
Angreeu		
Answer:		

#### Item Number: M032557

#### **SCORING**

#### **Correct Response**

• 11

#### **Incorrect Response**

• 8

• Other incorrect (including crossed out/erased, stray marks, illegible or off task).

## **Overall Percent Correct**

Korea, Republic of	64	
Singapore	58	<u> </u>
Chinese Taipei	57	_
Hong Kong, SAR	56	_
Russian Federation	53	<u> </u>
Romania	40	_
Hungary	38	
Israel	38	
	37	
Japan Estonia	37 35	
Latvia	34	<b>A</b>
Serbia and Montenegro	34	<b>A</b>
Armenia	33	
Moldova, Republic of	31	
Bulgaria	30	
Slovak Republic	28	
Belgium (Flemish)	28	
Lithuania	26	
Lebanon	25	0
International average	22	
Malaysia	20	0
Australia	20	0
United States	20	0
Cyprus	20	0
Macedonia, Republic of	18	▼
Scotland	18	0
Italy	16	▼
Netherlands	16	<b>*</b>
England	15	<b>*</b>
New Zealand	14	<b>*</b>
Slovenia	13	<b>*</b>
Sweden	10	_
Egypt	10	_
Jordan	9	_
Indonesia	8	* * * * * * * * * * * * * * * * * * *
Tunisia	5	
Palestinian Nat'l Auth.	5	
Philippines	5	
Morocco	4	$\blacksquare$
Iran, Islamic Republic of	3	$\blacksquare$
Chile	3	$\blacksquare$
Norway	3	$\blacksquare$
South Africa	3	* * * * * * * * * * * * * * * * * * * *
Botswana	2	$\blacksquare$
Bahrain	2	$\blacksquare$
Saudi Arabia	0	$\blacksquare$

# Country average vs. International average:

Higher
Not different
Lower

## The value of a + 2 times (b plus c) (continued)

Item Number: M032557

# **Student Responses**

### **Correct Response:**

If 
$$a + 2b = 5$$
 and  $c = 3$ , what is the value of  $a + 2(b + c)$ ?

Answer:

### **Incorrect Response:**

If a + 2b = 5 and c = 3, what is the value of a + 2(b + c)?

Answer: 8

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Solving Routine Problems

#### Three consecutive even numbers

Sam wanted to find three consecutive even numbers that add up to 84. He wrote the equation k + (k + 2) + (k + 4) = 84. What does the letter k represent?

- (A) The least of the three even numbers
- (B) The middle even number
- (C) The greatest of the three even numbers
- (D) The average of the three even numbers

Item Number: M022002

**Correct Response:** 

Λ

### **Overall Percent Correct**

Hong Kong, SAR	57	
Chinese Taipei	50	
Singapore	48	
Korea, Republic of	46	
Romania	42	
Estonia	37	
Russian Federation	36	
Moldova, Republic of	34	
Japan	34	
Bulgaria	34	
Serbia and Montenegro	33	
Latvia	33	
Hungary	31	
Israel	31	
Armenia	30	
Belgium (Flemish)	30	
Slovak Republic	27	0
Netherlands	27	0
Philippines	25	0
Bahrain	25	0
International average	24	
United States	23	0
Macedonia, Republic of	22	0
Italy	21	0
•		
Australia	20	0
Australia Botswana	20 20	O
Australia Botswana South Africa	20 20 19	0
Australia Botswana South Africa Saudi Arabia	20 20 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania	20 20 19 19	0
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus	20 20 19 19 19	0
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt	20 20 19 19 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan	20 20 19 19 19 19 18 18	0
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia	20 20 19 19 19 19 18 18	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England	20 20 19 19 19 19 18 18 16	0
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth.	20 20 19 19 19 19 18 18 16 16	0
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand	20 20 19 19 19 19 18 18 16 16	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of	20 20 19 19 19 18 18 16 16 16	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden	20 20 19 19 19 18 18 16 16 16 15	
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco	20 20 19 19 19 18 18 16 16 16 15 15	O
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Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	· · · · · · · · · · · · · · · · · · ·
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Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway Malaysia	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	· · · · · · · · · · · · · · · · · · ·

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Using Concepts

### Total number of books three boys have

Graham has twice as many books as Bob. Chan has six more books than Bob. If Bob has x books, which of the following represents the total number of books the three boys have?

- $\bigcirc$  3x + 6
- (c) 4x + 6
- (D) 5x + 6
- $\bigcirc$  8x + 2

Item Number: M022251

**Correct Response:** 

0

### **Overall Percent Correct**

Singapore Chinese Taipei Korea, Republic of Hong Kong, SAR Israel Hungary Slovak Republic Russian Federation Japan Somania Setonia Cyprus Belgium (Flemish) Italy Javia Latvia Lithuania Serbia and Montenegro Slovenia John Japan Slovenia John Japan John J	Singapore		
Korea, Republic of         55         A           Hong Kong, SAR         53         A           Israel         41         A           Hungary         41         A           Slovak Republic         38         A           Russian Federation         36         A           Japan         35         A           Romania         35         A           Netherlands         35         A           Estonia         34         A           Cyprus         34         A           Belgium (Flemish)         33         A           Italy         33         O           Latvia         32         O           Lithuania         32         O           New Zealand         31         O           Slovenia         31         O           Slovenia         31         O           Slovenia         29         O           Australia         28         O           Bulgaria         28         O           Sweden         28         O           Armenia         26         V           United States         26         V		66	
Hong Kong, SAR   53			
Israel       41       A         Hungary       41       A         Slovak Republic       38       A         Russian Federation       36       A         Japan       35       A         Romania       35       A         Netherlands       35       A         Estonia       34       A         Cyprus       34       A         Belgium (Flemish)       33       A         Italy       33       O         Latvia       32       O         Lithuania       32       O         New Zealand       31       O         Serbia and Montenegro       31       O         Slovenia       31       O         Slovenia       29       O         Australia       28       O         Bulgaria       28       O         Sweden       28       O         Armenia       26       O         United States       26       ▼         England       25       ▼         Malaysia       25       ▼         Scotland       25       ▼         Tunisia       24	Korea, Republic of	55	
Hungary       41         Slovak Republic       38         Russian Federation       36         Japan       35         Romania       35         Netherlands       35         Estonia       34         Cyprus       34         Belgium (Flemish)       33         Italy       33         Latvia       32         Lithuania       32         New Zealand       31         Serbia and Montenegro       31         Slovenia       31         O       29         Moldova, Republic of       29         Australia       28         Bulgaria       28         Sweden       28         Armenia       26         United States       26         England       25         V       V         Malaysia       25         Scotland       25         Tunisia       24         Norway       23         Iran, Islamic Republic of       23         Macedonia, Republic of       22         Egypt       21         Jordan       20         Lebanon<	Hong Kong, SAR	53	
Slovak Republic         38         A           Russian Federation         36         A           Japan         35         A           Romania         35         A           Netherlands         35         A           Estonia         34         A           Cyprus         34         A           Belgium (Flemish)         33         A           Italy         33         O           Latvia         32         O           Lithuania         32         O           New Zealand         31         O           Serbia and Montenegro         31         O           Slovenia         31         O           Slovenia         29         O           Australia         28         O           Armenia         26         V <td>Israel</td> <td>41</td> <td></td>	Israel	41	
Slovak Republic         38         A           Russian Federation         36         A           Japan         35         A           Romania         35         A           Netherlands         35         A           Estonia         34         A           Cyprus         34         A           Belgium (Flemish)         33         A           Italy         33         O           Latvia         32         O           Lithuania         32         O           New Zealand         31         O           Serbia and Montenegro         31         O           Slovenia         31         O           Slovenia         29         O           Australia         28         O           Armenia         26         V <td>Hungary</td> <td>41</td> <td></td>	Hungary	41	
Russian Federation         36         A           Japan         35         A           Romania         35         A           Netherlands         35         A           Estonia         34         A           Cyprus         34         A           Belgium (Flemish)         33         A           Italy         33         O           Latvia         32         O           Lithuania         32         O           New Zealand         31         O           Serbia and Montenegro         31         O           Slovenia         31         O           International average         29         O           Australia         28         O           Armenia         26         <		38	
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Philippines 19 ▼ Bahrain 18 ▼ Chile 18 ▼ Indonesia 18 ▼ Saudi Arabia 15 ▼ Botswana 13 ▼	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan	23 23 22 22 21 20	* * * * * * * * * * * * * * * * * * *
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Chile18▼Indonesia18▼Saudi Arabia15▼Botswana13▼	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth.	23 23 22 22 21 20 20 20	* * * * * * * * * * * * * * * * * * *
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth.	23 23 22 22 21 20 20 20	* * * * * * * * * * * * * * * * * * *
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines	23 23 22 22 21 20 20 20	<b>▼</b>
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain	23 23 22 22 21 20 20 20 19	<b>▼</b>
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile	23 23 22 22 21 20 20 20 19 18	<b>▼</b>
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia	23 23 22 22 21 20 20 20 19 18 18	<b>▼</b>
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia	23 23 22 22 21 20 20 20 19 18 18 18	<b>▼</b>
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia Botswana	23 23 22 22 21 20 20 20 19 18 18 18 15	<b>▼</b>
	Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia Botswana	23 23 22 22 21 20 20 20 19 18 18 18 15	<b>▼</b>

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Using Concepts

### Carla paid x zeds for 3 cartons of juice

Carla paid x zeds for 3 cartons of juice. What is the price in zeds of 1 carton of juice?

- $\frac{x}{3}$  $\bigcirc$
- $\bigcirc$
- $\bigcirc$  3 + x
- $\bigcirc$  3x

Item Number: M032044

**Correct Response:** 

## **Overall Percent Correct**

Singapore	85	<b>A</b>
Hong Kong, SAR	81	
Chinese Taipei	74	
Belgium (Flemish)	67	
Netherlands	62	
Malaysia	59	
Russian Federation	58	
England	55	
Hungary	55	
Korea, Republic of	53	
Estonia	53	
Israel	53	
Slovak Republic	52	
Sweden	52	
Japan	51	
Lithuania	51	
Scotland	49	
Australia	49	O
United States	48	
Armenia	48	0
Lebanon	48	0
Latvia	46	Ο
Italy	45	0
International average	45	
New Zealand	43	$\cap$

International average	45	
New Zealand	43	0
Serbia and Montenegro	42	0
Romania	42	0
Bulgaria	42	0
Moldova, Republic of	41	0
Philippines	40	▼
Norway	40	•
Slovenia	40	<b>▼</b>
Macedonia, Republic of	39	•
Indonesia	39	•
Tunisia	36	•
Cyprus	36	<b>▼ ▼</b>
Egypt	35	
Jordan	34	•
Chile	31	▼
Bahrain	30	•
Palestinian Nat'l Auth.	30	<b>▼</b>
Botswana	29	▼
Morocco	28	▼
Ghana	28	<b>▼</b>
South Africa	23	<b>V</b>
Saudi Arabia	22	•
Iran, Islamic Republic of	21	•

Country average vs. International average:

Higher 0 Not different  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

## Find *n* from proportionality equation

If  $\frac{12}{n} = \frac{36}{21}$ , then n equals

A 3

(B) 7

© 36

D 63

Item Number: M012040

**Correct Response:** 

D

## **Overall Percent Correct**

Singapore	93	
Korea, Republic of	89	
Hong Kong, SAR	88	<b>A</b>
Belgium (Flemish)	86	
Netherlands	85	<b>A</b>
Chinese Taipei	83	
Malaysia	83	<b>A</b>
United States	80	<b>A</b>
Hungary	79	_
Japan	79	_
Scotland	79	<u> </u>
Australia	76	<u> </u>
England	74	<u> </u>
Slovak Republic	74	_
Israel	72	<u> </u>
Slovenia	72	_
Estonia	71	_
Lebanon	71	<u> </u>
Russian Federation	71	<u> </u>
Latvia	70	<u> </u>
New Zealand	68	0
Iran, Islamic Republic of	66	0
Sweden	66	0
Cyprus	65	0
Cyprus Italy	65 65	0
,,		
Italy	65	
Italy International average	65 <b>64</b>	0
Italy International average Lithuania	65 <b>64</b> 64	0
Italy International average Lithuania Tunisia	65 <b>64</b> 64 64	0 0
International average Lithuania Tunisia Serbia and Montenegro	65 <b>64</b> 64 64 63	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of	65 <b>64</b> 64 64 63 61	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania	65 64 64 64 63 61 61	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria	65 64 64 64 63 61 61 59	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway	65 64 64 63 61 61 59 59	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt	65 64 64 63 61 61 59 59 58	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia	65 64 64 63 61 61 59 59 58 58	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia	65 64 64 63 61 61 59 59 58 58	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco	65 64 64 63 61 61 59 59 58 54 54	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan	65 64 64 63 61 61 59 58 58 54 54 53	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth.	65 64 64 63 61 61 59 58 58 54 54 53 52	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain	65 64 64 63 61 61 59 58 54 54 53 52 52	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain Chile	65 64 64 63 61 61 59 58 54 54 53 52 52 50 44 44	0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain Chile Botswana	65 64 64 63 61 61 59 58 54 54 53 52 52 50 44 44 41	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain Chile	65 64 64 63 61 61 59 58 54 54 53 52 52 50 44 44	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

28

Ghana

South Africa

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

## True expression for values of L,K,M

If L = 4 when K = 6 and M = 24, which of the following is true?

- $\bigcirc L = \frac{M}{K}$
- $\bigcirc$  L = KM

Item Number: M022196

**Correct Response:** 

Λ

## **Overall Percent Correct**

Singapore	88	<b>A</b>
Korea, Republic of	86	<b>A</b>
Hong Kong, SAR	84	<b>A</b>
Chinese Taipei	82	<b>A</b>
Estonia	81	<b>A</b>
Russian Federation	79	<b>A</b>
Hungary	79	<b>A</b>
Japan	77	<b>A</b>
Belgium (Flemish)	76	<b>A</b>
Slovak Republic	75	<b>A</b>
Latvia	75	<b>A</b>
Serbia and Montenegro	73	<b>A</b>
Lithuania	73	<b>A</b>
Sweden	70	<b>A</b>
Lebanon	69	<b>A</b>
Romania	67	<b>A</b>
Armenia	66	<b>A</b>
Slovenia	66	<b>A</b>
Israel	64	<b>A</b>
Moldova, Republic of	63	<b>A</b>
Bulgaria	63	0
Tunisia	63	
United States	62	<b>A</b>
Macedonia, Republic of	60	0
Netherlands	59	0
International average	58	
International average Morocco	<b>58</b> 57	0
International average Morocco Italy	<b>58</b> 57 57	0
International average Morocco Italy England	<b>58</b> 57 57 54	0 0
International average Morocco Italy England Malaysia	58 57 57 54 54	0 0 0
International average Morocco Italy England Malaysia Indonesia	58 57 57 54 54 54	0 0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus	58 57 57 54 54 54 54 52	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia	58 57 57 54 54 54 54 52 49	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland	58 57 57 54 54 54 52 49	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand	58 57 57 54 54 54 52 49 49	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan	58 57 57 54 54 54 52 49 49	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway	58 57 57 54 54 54 52 49 49 49 44	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt	58 57 57 54 54 54 52 49 49 49 40 38	0 0 0 0 0 •
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of	58 57 57 54 54 54 52 49 49 49 40 38 38	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth.	58 57 57 54 54 54 52 49 49 49 40 38 38 35	0 0 0 0 0 •
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain	58 57 57 54 54 54 52 49 49 49 44 40 38 38 35	0 0 0 0 0 •
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana	58 57 57 54 54 54 52 49 49 49 44 40 38 38 35 35	0 0 0 0 0 •
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines	58 57 57 54 54 52 49 49 40 38 38 35 28 25	0 0 0 0 0 •
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia	58 57 57 54 54 52 49 49 44 40 38 38 35 28 25 22	0 0 0 0 0 •
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia Chile	58 57 57 54 54 52 49 49 49 40 38 38 35 28 25 22 21	0 0 0 0 0 •
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia	58 57 57 54 54 52 49 49 44 40 38 38 35 28 25 22	0 0 0 0 0 •
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia Chile	58 57 57 54 54 52 49 49 49 40 38 38 35 28 25 22 21	0 0 0 0 0 •

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

### Solve equation for x

If $4(x + 5) = 80$ , then $x =$
Answer:
· · · · · · · · · · · · · · · · · · ·

Item Number: M022253

#### **SCORING**

#### **Correct Response**

• 15

#### **Incorrect Response**

- 25 [100 ÷ 4]
- 60 [80 (4 x 5)]
- 71 [80 4 5]
- Any expression or equation, other than x = 15, containing x.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Singapore82AKorea, Republic of82AJapan80AChinese Taipei80AEstonia72AHungary70ARussian Federation66ASlovak Republic65ABelgium (Flemish)64ALatvia64ASlovenia64AArmenia61ASerbia and Montenegro61ARomania60ABulgaria59AUnited States57AIsrael57ACyprus54AMoldova, Republic of53ALithuania51AAustralia50AMalaysia46ONetherlands44OInternational average44OInternational average44OMacedonia, Republic of37VItaly37VScotland37VLebanon31VSweden28VTunisia26VJordan25VIndonesia25VEgypt23VPalestinian Nat'l Auth.17VMorocco16VNorway11VChile9VSauth Africa5V	Korea, Republic of 82 A Japan 80 A Chinese Taipei 80 A Estonia 72 A Hungary 70 A Russian Federation 66 A Slovak Republic 65 A Belgium (Flemish) 64 A Latvia 64 A Slovenia 64 A Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Cyprus 54 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Egypt 23 V Philippines 22 P Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 V	Hong Kong, SAR	90	
Chinese Taipei 80 A Estonia 72 A Hungary 70 A Russian Federation 66 A Slovak Republic 65 A Belgium (Flemish) 64 A Latvia 64 A Slovenia 64 A Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Egypt 23 V Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 V Chile 9 Saudi Arabia 6 V	Japan80▲Chinese Taipei80▲Estonia72▲Hungary70▲Russian Federation66▲Slovak Republic65▲Belgium (Flemish)64▲Latvia64▲Slovenia64▲Armenia61▲Serbia and Montenegro61▲Romania60▲Bulgaria59▲United States57▲Israel57▲Cyprus54▲Moldova, Republic of53▲Lithuania51▲Australia50▲Malaysia46○Netherlands44○International average44○England44○New Zealand44○Macedonia, Republic of37▼Italy37▼Scotland37▼Lebanon31▼Sweden28▼Tunisia26▼Jordan25▼Indonesia25▼Egypt23▼Philippines22▼Bahrain19▼Iran, Islamic Republic of18▼Palestinian Nat'l Auth.17▼Morocco16▼Norway11▼Chile9▼Saudi Arabia5▼	Singapore	82	
Chinese Taipei 80	Chinese Taipei 80	Korea, Republic of	82	
Estonia 72 A Hungary 70 A Russian Federation 66 A Slovak Republic 65 A Belgium (Flemish) 64 A Latvia 64 A Slovenia 64 A Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Cyprus 54 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 R Bahrain 19 Iran, Islamic Republic of 18 P Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 V Chile 9 Saudi Arabia 6 V	Estonia 72 A Hungary 70 A Russian Federation 66 A Slovak Republic 65 A Belgium (Flemish) 64 A Latvia 64 A Slovenia 64 A Armenia 61 A Serbia and Montenegro 61 A Romania 60 Bulgaria 59 A United States 57 A Israel 57 A Cyprus 54 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 Sweden 28 V Tunisia 26 V Jordan 25 V Egypt 23 V Philippines 22 V Bahrain 19 Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 50 V	Japan	80	
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Russian Federation  Slovak Republic  Belgium (Flemish)  Latvia  64  A Glovenia  Armenia  Serbia and Montenegro  Romania  Bulgaria  United States  Israel  Cyprus  Moldova, Republic of  Lithuania  Australia  Malaysia  Netherlands  International average  England  Macedonia, Republic of  Italy  Scotland  Lebanon  Sweden  Tunisia  Jordan  Indonesia  Egypt  Palestinian Nat'l Auth.  Norway  International Arabia  Falestinian Nat'l Auth.  Norway  Tunise  Saudi Arabia  64  A  A  A  A  A  A  A  A  A  A  A  A  A	Russian Federation 66 Slovak Republic 65 Belgium (Flemish) 64 Latvia 64 Slovenia 64 Armenia 61 Serbia and Montenegro 61 Romania 60 Bulgaria 59 United States 57 Israel 57 Cyprus 54 Moldova, Republic of 53 Lithuania 51 Australia 50 Malaysia 46 Netherlands 44 International average 44 England 44 New Zealand 44 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 56 South Africa 5	Estonia	72	
Slovak Republic Belgium (Flemish) Latvia 64 A Slovenia 64 Armenia 61 A Serbia and Montenegro Romania Bulgaria United States Israel Cyprus Moldova, Republic of Lithuania Australia Malaysia Netherlands Hengland New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Palestinian Nat'l Auth. New Zealinia Nat'l Auth. Palestinian Nat'l Auth. Nevelan Republic of Romania Roma	Slovak Republic Belgium (Flemish) Latvia G4 Armenia G64 Armenia G61 Armenia G61 Romania G60 Bulgaria United States Israel Cyprus Moldova, Republic of Lithuania Australia Malaysia Netherlands Hengland Macedonia, Republic of Soctland Lebanon Sitaly Scotland Sweden Tunisia Jordan Sweden Tunisia Jordan Indonesia Egypt Palestinian Nat'l Auth. Morocco Norway International G4 A A A A Activia A A A A A A A A A A A A A A A A A A A	Hungary	70	
Belgium (Flemish) 64 Latvia 64 Slovenia 64 Armenia 61 Serbia and Montenegro 61 Romania 60 Bulgaria 59 United States 57 Israel 57 Cyprus 54 Moldova, Republic of 53 Lithuania 51 Australia 50 Malaysia 46 Netherlands 44 Onternational average 44 England 44 New Zealand 44 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia	Belgium (Flemish) 64 Latvia 64 Slovenia 64 Armenia 61 Serbia and Montenegro 61 Romania 60 Bulgaria 59 United States 57 Israel 57 Cyprus 54 Moldova, Republic of 53 Lithuania 51 Australia 50 Malaysia 46 Netherlands 44 International average 44 England 44 New Zealand 44 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 56	Russian Federation	66	
Latvia 64 A Slovenia 64 A Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 P Bahrain 19 Iran, Islamic Republic of 18 P Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 V Chile 9 Saudi Arabia 6	Latvia 64 A Slovenia 64 A Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Moldova, Republic of 53 Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 50 A	Slovak Republic	65	
Slovenia 64 Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Moldova, Republic of 53 A Lithuania 51 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Scotland 37 V Scotland 37 V Lebanon 31 Sweden 28 V Tunisia 26 V Jordan 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 V Chile 9 Saudi Arabia 50 A Marcedonia, Republic of 18 V Scotland 19 V Scotland 1	Slovenia 64 Armenia 61 Armenia 60 Armenia 60 Bulgaria 59 United States 57 Israel 57 Armenia 57 Armenia 57 Armenia 57 Armenia 57 Armenia 57 Armenia 51 Armenia 51 Armenia 51 Armenia 50 Armenia 51 Armenia 50 Armenia 44 Armenia 50 Armenia 44 Armenia 44 Armenia 44 Armenia 44 Armenia 50 Armenia 51 Armenia 50 Armenia 51 Armenia 50 Armenia 50 Armenia 51 Armenia 52 Armenia 51 Armenia 52 Arme	Belgium (Flemish)	64	
Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Netherlands 44 O International average 44 England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6	Armenia 61 A Serbia and Montenegro 61 A Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Cyprus 54 A Moldova, Republic of 53 Lithuania 51 A Australia 50 A Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6 V	Latvia	64	
Serbia and Montenegro Romania Romania Bulgaria United States Israel S7 Cyprus S4 Moldova, Republic of Lithuania Australia Netherlands Fingland New Zealand Macedonia, Republic of Italy Scotland Lebanon Syweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. New Zealin Romania Roman	Serbia and Montenegro 61 Romania 60 Bulgaria 59 United States 57 Israel 57 Cyprus 54 Moldova, Republic of 53 Lithuania 51 Australia 50 Malaysia 46 Netherlands 44 International average 44 England 44 New Zealand 44 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	Slovenia	64	
Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Cyprus 54 A Moldova, Republic of 53 A Lithuania 51 A Australia 50 A Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6	Romania 60 A Bulgaria 59 A United States 57 A Israel 57 A Cyprus 54 A Moldova, Republic of 53 Lithuania 51 A Australia 50 A Netherlands 44 O International average 44 England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6 V	Armenia	61	
Bulgaria 59	Bulgaria 59	Serbia and Montenegro	61	
United States  Israel  Cyprus  Moldova, Republic of  Lithuania  Australia  Malaysia  Netherlands  International average  England  Macedonia, Republic of  Italy  Scotland  Lebanon  Sweden  Tunisia  Jordan  Indonesia  Egypt  Philippines  Bahrain  Iran, Islamic Republic of  Palestinian Nat'l Auth.  Morocco  Norway  Tunise  Palestinian Nat'l Auth.  Morocco  Norway  Sort  A  A  A  A  A  A  A  A  A  A  A  A  A	United States 57	Romania	60	
Israel 57 Cyprus 54 Moldova, Republic of 53 Lithuania 51 Australia 50 Malaysia 46 Netherlands 44 International average 44 England 44 New Zealand 44 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia	Israel 57 Cyprus 54 Moldova, Republic of 53 Lithuania 51 Australia 50 Malaysia 46 Netherlands 44  International average 44  England 44 New Zealand 44 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	Bulgaria	59	
Cyprus 54	Cyprus 54   Moldova, Republic of 53   Lithuania 51   Australia 50   Malaysia 46   Netherlands 44   International average 44   England 44   New Zealand 44   Macedonia, Republic of 37   Italy 37   Scotland 37   Lebanon 31   Sweden 28   Tunisia 26   Jordan 25   Indonesia 25   Egypt 23   Philippines 22   Bahrain 19   Iran, Islamic Republic of 18   Palestinian Nat'l Auth. 17   Morocco 16   Norway 11   Chile 9   Saudi Arabia 6   South Africa 5	United States	57	
Moldova, Republic of Lithuania 51 A Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 ▼ Italy 37 ▼ Scotland 37 ▼ Lebanon 31 ▼ Sweden 28 ▼ Tunisia 26 ▼ Jordan 25 ▼ Indonesia 25 ▼ Indonesia 25 ▼ Egypt 23 ▼ Philippines 22 ▼ Bahrain 19 ▼ Iran, Islamic Republic of 18 ▼ Palestinian Nat'l Auth. 17 ▼ Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Moldova, Republic of Lithuania 51 Australia 50 Malaysia 46 0 Netherlands 44 0 International average 44 England 44 0 Macedonia, Republic of 37 Italy 37 Scotland 37 Lebanon 31 Sweden 28 Tunisia 26 Jordan 25 Indonesia 25 Egypt 23 Philippines 22 Bahrain 19 Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	Israel	57	
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Australia 50 A  Malaysia 46 O  Netherlands 44 O  International average 44  England 44 O  Macedonia, Republic of 37 V  Italy 37 V  Scotland 37 V  Lebanon 31 V  Sweden 28 V  Tunisia 26 V  Jordan 25 V  Indonesia 25 V  Egypt 23 V  Philippines 22 V  Bahrain 19 V  Iran, Islamic Republic of 18 V  Palestinian Nat'l Auth. 17 V  Morocco 16 V  Norway 11 V  Chile 9 V  Saudi Arabia 6 V	Australia 50 A Malaysia 46 O Netherlands 44 O International average 44 England 44 O Macedonia, Republic of 37 V Italy 37 Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 Saudi Arabia 6 South Africa 5	Moldova, Republic of	53	
Malaysia 46 O Netherlands 44 O International average 44 England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6 V	Malaysia 46 O Netherlands 44 O International average 44 England 44 O Mew Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6 V South Africa 5	Lithuania	51	
Netherlands 44 O International average 44  England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6 V	Netherlands 44 O International average 44 England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 6 V	Australia	50	
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England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 Morocco 16 V Norway 11 V Chile 9 V Saudi Arabia 66 V	England 44 O New Zealand 44 O Macedonia, Republic of 37 V Italy 37 V Scotland 37 V Lebanon 31 V Sweden 28 V Tunisia 26 V Jordan 25 V Indonesia 25 V Egypt 23 V Philippines 22 V Bahrain 19 V Iran, Islamic Republic of 18 V Palestinian Nat'l Auth. 17 V Morocco 16 V Norway 11 V Chile 9 Saudi Arabia 6 South Africa 5		44	0
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	South Africa 5	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway	44 44 37 37 31 28 26 25 25 23 22 19 18 17 16	O V
L Courth Atrica		England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile	44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11	O V
	Botswana 5 V	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia	44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9	O V
Botswana 5		England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia South Africa	44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9 6	O V
		England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia South Africa	44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9 6	O V

Country average vs. International average:

### Solve equation for *x* (continued)

Item Number: M022253

# **Student Responses**

### **Correct Response:**

If 
$$4(x+5) = 80$$
, then  $x = 4(x+5) = 80$ 

Answer: \_\_\_15

### **Incorrect Response:**

If 
$$4(x + 5) = 80$$
, then  $x =$ 

Answer: 🔌

$$\frac{4x}{4} = 60$$

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

## If x plus 3y equals 11 and 2x plus 3y equals 13

If x + 3y = 11 and 2x + 3y = 13, then y =

- A 3
- B) 2
- $\bigcirc$  -3

Item Number: M032728

**Correct Response:** 

Α

## **Overall Percent Correct**

Korea, Republic of	76	<b>A</b>
Singapore	70	
Chinese Taipei	69	
Japan	61	
Hong Kong, SAR	59	
Scotland	55	
Belgium (Flemish)	53	
Latvia	51	
Estonia	50	
United States	49	
Serbia and Montenegro	49	
England	49	0
Romania	48	O
Hungary	47	0
Slovak Republic	46	0
New Zealand	45	0
Moldova, Republic of	45	0
Bulgaria	45	0
Russian Federation	44	0
Australia	44	0
Israel	44	0
Netherlands	43	O
Malaysia	43	Ο
International average	42	
Lebanon	40	0

Lebanon	40	0
Botswana	38	0
Lithuania	37	0
Jordan	37	$\blacksquare$
Tunisia	36	▼
Slovenia	36	0
Macedonia, Republic of	36	▼
Sweden	35	$\blacksquare$
Philippines	35	$\blacksquare$
Cyprus	34	▼
Egypt	34	▼
Iran, Islamic Republic of	34	▼
Indonesia	33	$\blacksquare$
Chile	31	$\blacksquare$
Palestinian Nat'l Auth.	31	$\blacksquare$
South Africa	31	$\blacksquare$
Norway	30	$\blacksquare$
Saudi Arabia	29	$\blacksquare$
Armenia	29	$\blacksquare$
Italy	28	▼
Bahrain	27	•
Morocco	23	$\blacksquare$

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Solving Routine Problems

## If x minus y equals 5 and x/2 equals 3

If x - y = 5 and  $\frac{x}{2} = 3$ , what is the value of y?

- A) 6
- (B)
- (c) -1
- D -7

Item Number: M032208

**Correct Response:** 

В

## **Overall Percent Correct**

Singapore Korea, Republic of Hong Kong, SAR Chinese Taipei Australia Belgium (Flemish) New Zealand Hungary England United States Scotland Japan Malaysia Israel Estonia Serbia and Montenegro Romania Latvia Slovenia Cyprus Norway Sweden Netherlands	82 79 78 77 69 69 67 66 63 61 58 58 58 57 56 55 55 55 53 53	
Lithuania Russian Federation	53 52	0 0
International average	51	
Lebanon	48	0
Lebarion	40	U
Slovak Republic	47	0
		0
Slovak Republic Moldova, Republic of Italy	47	0 0 <b>V</b>
Slovak Republic Moldova, Republic of	47 47 46 45	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria	47 47 46 45 44	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth.	47 47 46 45 44 43	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia	47 47 46 45 44 43 43	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana	47 47 46 45 44 43 43 39	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia	47 47 46 45 44 43 43 39 38	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain	47 47 46 45 44 43 43 39 38 38	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan	47 47 46 45 44 43 43 39 38 38 38	0 0 <b>V</b>
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Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines	47 47 46 45 44 43 43 39 38 38 38 37	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt	47 46 45 44 43 43 39 38 38 38 37 36 33	0 0 <b>V</b>
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Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia Morocco	47 46 45 44 43 43 39 38 38 37 36 33 31 31	0 0 <b>V</b>
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia Morocco South Africa	47 47 46 45 44 43 43 39 38 38 37 36 33 31 31 30	0 0 <b>V</b>

Country average vs. International average:

0

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Solving Routine Problems

## If a/b equals 70

If  $\frac{a}{b} = 70$ , then  $\frac{a}{2b} =$ 

A) 35

(B) 68

(c) 72

D 140

Item Number: M032210

**Correct Response:** 

Λ

## **Overall Percent Correct**

Chinese Taipei	70	
Singapore	69	
Korea, Republic of	69	
Hong Kong, SAR	68	
Estonia	61	
Russian Federation	60	
Hungary	58	
Serbia and Montenegro	57	
Japan	55	
Romania	53	
Latvia	53	
Belgium (Flemish)	52	
Lithuania	51	
Slovak Republic	47	<b>A</b>
Bulgaria	46	
Israel	44	
Italy	44	0
Macedonia, Republic of	42	0
Moldova, Republic of	41	0
Indonesia	41	0
Armenia	41	0
International average	40	
	40	Ο
Netherlands	40 38	0
Netherlands Sweden	38	0
Netherlands Sweden United States	38 38	0
Netherlands Sweden United States England	38 38 38	0 0
Netherlands Sweden United States England Lebanon	38 38 38 37	0 0 0
Netherlands Sweden United States England Lebanon Slovenia	38 38 38 37 37	0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia	38 38 38 37 37	0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia	38 38 38 37 37 37 36	0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand	38 38 38 37 37 37 36 32	0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland	38 38 38 37 37 37 36 32 30	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus	38 38 37 37 37 36 32 30	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia	38 38 38 37 37 37 36 32 30 30	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines	38 38 37 37 37 36 32 30 30 30 27	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of	38 38 38 37 37 36 32 30 30 27 27	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt	38 38 37 37 37 36 32 30 30 27 27 26	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana	38 38 37 37 37 36 32 30 30 27 27 26 25	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco	38 38 37 37 37 36 32 30 30 27 27 26 25 24	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan	38 38 37 37 37 36 32 30 30 27 27 26 25 24 23	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan Norway	38 38 37 37 37 36 32 30 30 27 27 26 25 24 23 22	0 0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan Norway Chile	38 38 38 37 37 37 36 32 30 30 27 27 26 25 24 23 22 22	0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan Norway	38 38 37 37 37 36 32 30 30 27 27 26 25 24 23 22	0 0 0 0 0 0 0 0 0

Country average vs. International average:

15

Saudi Arabia

Bahrain

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Solving Routine Problems

### 7 oranges and 4 lemons cost 43 zeds

At a market, 7 oranges and 4 lemons cost 43 zeds, and 11 oranges and 12 lemons cost 79 zeds. Using $x$ to represent the cost of an orange and $y$ to represent the cost of a lemon, write two equations that could be used to find the values of $x$ and $y$ .	
Equation 1:	
Equation 2:	

#### Item Number: M032545

#### **SCORING**

#### **Correct Response**

• 7x + 4y = 43 (or equivalent) and 11x + 12y = 79 (or equivalent).

#### **Incorrect Response**

- One equation correct and one incorrect/missing.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Hong Kong, SAR	72	<b>A</b>
Japan	67	
Chinese Taipei	62	<u> </u>
Armenia	61	_
Singapore	60	<u> </u>
Korea, Republic of	57	<u> </u>
Estonia	46	_
Serbia and Montenegro	43	<u> </u>
Israel	41	<u> </u>
Russian Federation	39	<u> </u>
Romania	38	<u> </u>
Jordan	37	_
Hungary	34	_
Bulgaria	33	
Moldova, Republic of	27	0
Egypt	27	0
Slovak Republic	25	0
'	23	0
Macedonia, Republic of International average	24	0
Belgium (Flemish)	22	0
Iran, Islamic Republic of	20	0
United States	20	▼
Latvia	20	<b>*</b>
Scotland	20	<b>*</b>
Lithuania	19	<b>*</b>
England	18	<b>*</b>
Bahrain	16	<b>*</b>
Indonesia	16	*
	15	
Malaysia Sweden	15	_
Australia	15	* * * * * * * * * * * * * * * * * * *
	14	
Italy		Ž
New Zealand	12 11	Ž
Cyprus Slovenia	9	Ž
Morocco	9	
	-	
Netherlands	9	
Philippines	7	_
Palestinian Nat'l Auth.	6	_
Lebanon	6	<u>*</u>
Botswana	5	<u>*</u>
Saudi Arabia	4	<b>*</b>
Norway	3	▼ _
Chile	3	<b>▼</b>
Ghana	2	<b>▼</b>
South Africa	2	_
Tunicia	1	_
Tunisia	1	▼

# Country average vs. International average:

### 7 oranges and 4 lemons cost 43 zeds (continued)

Item Number: M032545

# **Student Responses**

### **Correct Response:**

At a market, 7 oranges and 4 lemons cost 43 zeds, and 11 oranges and 12 lemons cost 79 zeds. Using x to represent the cost of an orange and y to represent the cost of a lemon, write two equations that could be used to find the values of x and y.

Equation 1:  $X = \frac{13 - 14}{7}$ 

Equation 2:  $\sqrt{=\frac{79-11}{12}}$ 

### **Incorrect Response:**

At a market, 7 oranges and 4 lemons cost 43 zeds, and 11 oranges and 12 lemons cost 79 zeds. Using x to represent the cost of an orange and y to represent the cost of a lemon, write two equations that could be used to find the values of x and y.

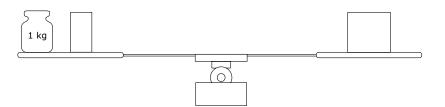
Equation 1: 7x + 4y = Z

Equation 2: 1/4 + 12 1 = 7

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Using Concepts

### Objects balanced on scale

The objects on the scale make it balance exactly. On the left pan there is a 1 kg weight (mass) and half a brick. On the right pan there is one brick.



What is the weight (mass) of one brick?

- $\bigcirc$  0.5 kg
- (B) 1 kg
- © 2 kg
- $\bigcirc$  3 kg

Item Number: M012002

**Correct Response:** 

C

### **Overall Percent Correct**

Estonia	86	$\blacktriangle$
Russian Federation	85	$\blacktriangle$
Netherlands	83	<b>A</b>
Japan	82	<b>A</b>
Singapore	82	<b>A</b>
Hong Kong, SAR	81	<b>A</b>
Italy	79	<b>A</b>
Belgium (Flemish)	78	<b>A</b>
Korea, Republic of	78	<b>A</b>
Slovak Republic	78	<b>A</b>
Sweden	78	<b>A</b>
Latvia	77	<b>A</b>
Australia	76	<b>A</b>
Chinese Taipei	76	<b>A</b>
England	76	<b>A</b>
Lithuania	76	<b>A</b>
Hungary	75	<b>A</b>
New Zealand	75	<b>A</b>
Malaysia	74	<b>A</b>
Scotland	74	<b>A</b>
United States	74	<b>A</b>
Bulgaria	73	<b>A</b>
Slovenia	73	<b>A</b>
Moldova, Republic of	68	<b>A</b>
Israel	67	<b>A</b>
Israel Norway	67 66	0
131461	66 66	0 0
Norway	66 66 65	0 0 0
Norway Romania Serbia and Montenegro Cyprus	66 66 65 64	0 0
Norway Romania Serbia and Montenegro Cyprus International average	66 66 65 64 <b>63</b>	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of	66 66 65 64 <b>63</b>	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of	66 66 65 64 <b>63</b> 63	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan	66 66 65 64 <b>63</b> 63 63 52	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia	66 66 65 64 <b>63</b> 63 63 52	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia	66 66 65 64 <b>63</b> 63 63 52 51	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile	66 66 65 64 <b>63</b> 63 63 52 51 51	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth.	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain	66 66 65 64 63 63 63 52 51 51 50 49 45 42	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49 45 42	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49 45 42 42 41	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49 45 42 42 41 41	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana	66 66 65 64 63 63 63 52 51 51 50 49 45 42 42 41 41 36	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines	66 66 65 64 63 63 63 52 51 51 50 49 45 42 42 41 41 36 34	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines Saudi Arabia	66 66 65 64 63 63 63 52 51 51 50 49 45 42 41 41 36 34 31	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines Saudi Arabia South Africa	66 66 65 64 63 63 63 52 51 51 50 49 45 42 41 41 36 34 31 28	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines Saudi Arabia	66 66 65 64 63 63 63 52 51 51 50 49 45 42 41 41 36 34 31	0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Using Concepts

## If y equals 3x plus 2

If y = 3x + 2, which of these expresses x in terms of y?

$$x = \frac{y}{3} - 2$$

Item Number: M032046

# **Correct Response:**

Α

## **Overall Percent Correct**

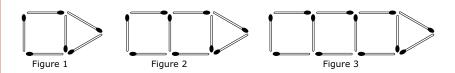
Singapore Hong Kong, SAR Korea, Republic of Chinese Taipei Japan Armenia Russian Federation Romania Serbia and Montenegro Moldova, Republic of	61 60 52 48 46 45 44 44 43 34	<b>* * * * * * * * * *</b>
Bulgaria Malaysia Belgium (Flemish) Indonesia Macedonia, Republic of Estonia	34 31 31 30 30 27	▲ ▲ ▲ ○
United States International average	26 <b>25</b>	0
Lebanon Israel Jordan Philippines Egypt Lithuania Hungary Latvia Cyprus Italy England Slovak Republic Australia Netherlands Tunisia Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Slovenia New Zealand Scotland Morocco Saudi Arabia Sweden Botswana South Africa	24 24 23 22 21 21 21 20 20 20 19 18 17 17 16 15 15 15 14 12 12 11 10	O O
Chile Norway	9 6	▼

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Patterns	Reasoning

### Number of matchsticks continuing pattern

Matchsticks are arranged as shown in the figures.



If the pattern is continued, how many matchsticks would be used to make Figure 10?

- A 30
- B 33
- © 36
- D 39
- E) 42

Item Number: M012017

**Correct Response:** 

В

### **Overall Percent Correct**

Korea, Republic of	78	<b>A</b>
Singapore	73	<b>A</b>
Chinese Taipei	71	<b>A</b>
Japan	67	<b>A</b>
Hong Kong, SAR	66	<b>A</b>
Belgium (Flemish)	64	<b>A</b>
New Zealand	63	<b>A</b>
Australia	62	<b>A</b>
Scotland	61	<b>A</b>
Hungary	61	<b>A</b>
Slovak Republic	60	<b>A</b>
Netherlands	59	<b>A</b>
Russian Federation	59	
Sweden	59	<b>A</b>
Estonia	58	
Israel	58	<b>A</b>
Malaysia	57	<b>A</b>
United States	56	_
Slovenia	56	<u> </u>
Lithuania	56	<u> </u>
Moldova, Republic of	55	<u> </u>
Italy	54	<u> </u>
Bulgaria	53	0
England	52	0
Lingiana	52	
Romania	51	$\circ$
Romania Serbia and Montenegro	51 51	0
Serbia and Montenegro	51	0
Serbia and Montenegro Macedonia, Republic of	51 50	0 0
Serbia and Montenegro Macedonia, Republic of Latvia	51 50 49	0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus	51 50 49 49	0 0
Serbia and Montenegro Macedonia, Republic of Latvia	51 50 49	0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia	51 50 49 49	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway	51 50 49 49 48 47	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia	51 50 49 49 48 47 46	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile	51 50 49 49 <b>48</b> 47 46 43	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain	51 50 49 49 48 47 46 43 41	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines	51 50 49 49 48 47 46 43 41 37 34	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of	51 50 49 49 48 47 46 43 41 37	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon	51 50 49 49 48 47 46 43 41 37 34 33	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan	51 50 49 49 48 47 46 43 41 37 34 33 32	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt	51 50 49 49 48 47 46 43 41 37 34 33 32 30	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29 29	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth.	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29 29 29	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29 29 29 27	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana Morocco	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29 29 29 27 26	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana Morocco South Africa	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29 29 29 27 26 24	0 0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana Morocco South Africa Saudi Arabia	51 50 49 49 48 47 46 43 41 37 34 33 32 30 29 29 29 27 26 24 16	0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Patterns	Reasoning

# Numbers in sequence increasing by 4

The numbers in the sequence 7, 11, 15, 19, 23, increase by four. The numbers in the sequence 1, 10, 19, 28, 37, increase by nine. The number 19 is in both sequences. If the two sequences are continued, what is the next number that is in BOTH the first and the second sequences?
Answer:

#### Item Number: M022008

#### **SCORING**

#### Correct

• 55

#### **Incorrect Response**

- 27 AND 46 [23 + 4 and 37 + 9]
- Either 27 OR 46
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Armenia	63	<b>A</b>
Korea, Republic of	51	<b>A</b>
Singapore	50	<b>A</b>
Hungary	49	<b>A</b>
Japan	46	<b>A</b>
United States	45	<b>A</b>
Italy	45	<b>A</b>
Belgium (Flemish)	43	<b>A</b>
Slovenia	41	<b>A</b>
Australia	39	<b>A</b>
Hong Kong, SAR	39	<b>A</b>
Slovak Republic	39	<b>A</b>
Chinese Taipei	39	<b>A</b>
Bulgaria	38	<b>A</b>
Estonia	38	<b>A</b>
Netherlands	38	<b>A</b>
Scotland	37	<b>A</b>
Sweden	35	<b>A</b>
Malaysia	35	<b>A</b>
England	34	0
Tunisia	34	0
New Zealand	33	0
Lithuania	33	0
Russian Federation	32	0
Romania	32	0
Romania Israel	32 31	0
	31 31	
Israel Cyprus Latvia	31 31 31	0
Israel Cyprus Latvia International average	31 31 31 31	0 0
Israel Cyprus Latvia International average Moldova, Republic of	31 31 31 31 31	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of	31 31 31 31 30 25	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of	31 31 31 31 30 25 24	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile	31 31 31 31 30 25 24 24	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia	31 31 31 31 30 25 24 24 23	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro	31 31 31 31 30 25 24 24 23 23	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain	31 31 31 31 30 25 24 24 23 23 22	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco	31 31 31 31 30 25 24 24 23 23 22 20	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway	31 31 31 30 25 24 24 23 23 22 20 20	0 0 0 V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth.	31 31 31 30 25 24 24 23 23 22 20 20	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana	31 31 31 30 25 24 24 23 23 22 20 20 19	0 0 0 V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17	0 0 0 V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16	0 0 0 V V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14	0 0 0 V V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14	0 0 0 V V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines Saudi Arabia	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14 14 8	0 0 0 V V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines Saudi Arabia South Africa	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14 14 8 6	0 0 0 V V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines Saudi Arabia	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14 14 8	0 0 0 V

# Country average vs. International average:

Higher
Not different
Lower

#### Numbers in sequence increasing by 4 (continued)

Item Number: M022008

### **Student Responses**

#### **Correct Response:**

The numbers in the sequence 7, 11, 15, 18, 23, ... increase by four. The numbers in the sequence 1, 10, 19, 28, 37, ... increase by nine. The number 19 is in both sequences. If the two sequences are continued, what is the next number that is in BOTH the first and the second sequences?

Answer: 55

7, 11, 15, 19, 23, 27, 31, 35, 39, 43, 47, 51 (55, 59, 63, 63, 64, 65)

1, 10, 19, 28, 37, 46, 65

### **Incorrect Response:**

The numbers in the sequence 7, 11, 15, 19, 23, ... increase by four. The numbers in the sequence 1, 10, 19, 28, 37, ... increase by nine. The number 19 is in both sequences. If the two sequences are continued, what is the next number that is in BOTH the first and the second sequences?

Answer: 46

Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

### Sequence of figures with triangles: fill table

The three figures below are divided into small congruent triangles.





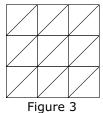


Figure 1

A. Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

Figure	Number of Small Triangles
1	2
2	8
3	
4	

B. The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Δησπαρ		

C. The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Item Number: M022261A

#### **SCORING**

#### **Correct Response**

• 18 AND 32

#### **Incorrect Response**

- 18 and any number other than 32.
- 18 and no numerical response for the 4th figure.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

#### **Overall Percent Correct**

Korea, Republic of	78	<b>A</b>
Singapore	74	
Japan	74	
Hong Kong, SAR	72	
Chinese Taipei	69	
Netherlands	59	
Australia	57	
England	57	
New Zealand	55	
Armenia	53	
Scotland	53	
Belgium (Flemish)	51	
Hungary	50	
United States	50	
Estonia	50	
Sweden	49	
Slovenia	42	
Malaysia	42	
Israel	42	
Russian Federation	41	
Slovak Republic	40	0
Latvia	38	0
Lithuania	38	0
International average	36	

International average	36	
Italy	35	0
Norway	34	0
Romania	31	0
Moldova, Republic of	31	•
Serbia and Montenegro	31	$\blacksquare$
Cyprus	30	$\blacksquare$
Bulgaria	30	$\blacksquare$
Macedonia, Republic of	25	$\blacksquare$
Chile	23	$\blacksquare$
Jordan	21	$\blacksquare$
Indonesia	20	$\blacksquare$
Palestinian Nat'l Auth.	17	$\blacksquare$
Philippines	17	* * * * * * * * * * * * * * * * * * *
Morocco	16	$\blacksquare$
Bahrain	16	$\blacksquare$
Iran, Islamic Republic of	15	$\blacksquare$
Egypt	15	<b>▼</b>
Lebanon	12	$\blacksquare$
Botswana	11	<b>V</b>
South Africa	6	$\blacksquare$
Tunisia	5	<b>▼</b>
Saudi Arabia	4	$\blacksquare$
Ghana	3	$\blacksquare$

Country average vs. International average:

Higher
Not different
Lower

### Sequence of figures with triangles: fill table (continued)

Item Number: M022261A

# **Student Responses**

### **Correct Response:**

The three figures below are divided into small congruent triangles.

1/2

Figure 1

Figure 2

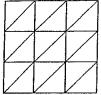


Figure 3

a) Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

	Number of
Figure	small triangles
1	2
2	8
3	18
4	32

#### **Incorrect Response:**

The three figures below are divided into small congruent triangles.



Figure 1



Figure 2

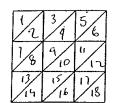


Figure 3

a) Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

	Number of	
Figure	small triangles	
1	2	
2	8	
3	18	
4	25	

Content Domain	Main Topic	Cognitive Domain	
A. ALGEBRA	Patterns	Solving Routine Problems	
B. ALGEBRA	Patterns	Solving Routine Problems	
C. ALGEBRA	Patterns	Reasoning	

### Sequence of figures with triangles: 7th figure

The three figures below are divided into small congruent triangles.





Figure 3

A. Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

Figure	Number of Small Triangles
1	2
2	8
3	
4	

B. The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Answer:	
---------	--

C. The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Item Number: M022261B

#### **SCORING**

#### **Correct Response**

• 98

#### **Incorrect Response**

- 49 [Multiplies 7 x 7]
- 58 [Series is 2, 8, 18, 28, 38...7th term is 58]
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

#### **Overall Percent Correct**

Korea, Republic of	60	<b>A</b>
Singapore	56	
Chinese Taipei	56	
Hong Kong, SAR	56	
Japan Japan	55	
Armenia	42	<b>A</b>
Netherlands	40	<u> </u>
Australia	33	<u> </u>
Scotland	31	<u> </u>
Hungary	30	_
United States	30	
New Zealand	29	<b>A</b>
Belgium (Flemish)	28	_
Sweden	26	<u> </u>
England	25	0
Malaysia	24	0
Estonia	24	0
Italy	24	0
Russian Federation	23	0
Slovenia	22	0
Slovak Republic	22	0
International average	22	
Moldova, Republic of	20	0
, -p		
Israel	20	0
Israel Lithuania	20 19	0
Lithuania	19	0
Lithuania Romania	19 19	0
Lithuania Romania Latvia	19 19 19	0 0 0
Lithuania Romania Latvia Serbia and Montenegro	19 19 19 19	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus	19 19 19 19 17	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria	19 19 19 19 17 16	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia	19 19 19 19 17 16 15	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway	19 19 19 19 17 16 15	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan	19 19 19 19 17 16 15 14	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines	19 19 19 19 17 16 15 14 12	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth.	19 19 19 19 17 16 15 14 12 11	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of	19 19 19 19 17 16 15 14 12 11	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile	19 19 19 17 16 15 14 12 11 11 10 9	0 0 0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt	19 19 19 17 16 15 14 12 11 11 10 9	0
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain	19 19 19 17 16 15 14 12 11 11 10 9	
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of	19 19 19 17 16 15 14 12 11 10 9 9 8 7	
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco	19 19 19 17 16 15 14 12 11 10 9 8 7	
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon	19 19 19 17 16 15 14 12 11 10 9 8 7 7 6	
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana	19 19 19 17 16 15 14 12 11 10 9 8 7 7 6 5	
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa	19 19 19 19 17 16 15 14 12 11 10 9 8 7 7 6 5 4	
Lithuania Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa Tunisia	19 19 19 17 16 15 14 12 11 10 9 8 7 7 6 5 4 2	0 0 0

#### Country average vs. International average:

Higher Not different 0 ▼ Lower

Sequence of figures with triangles: 7th figure (continued)

Item Number: M022261B

# **Student Responses**

### **Correct Response:**

The three figures below are divided into small congruent triangles.

1/2



Figure 1

Figure 2

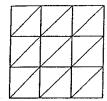


Figure 3

b) The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Answer: 98

### **Incorrect Response:**

The three figures below are divided into small congruent triangles.

1 2

Figure 1



Figure 2

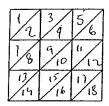


Figure 3

b) The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

58

Answer:

Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

### Sequence of figures with triangles: 50th figure

The three figures below are divided into small congruent triangles.





Figure 3

A. Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

Figure	Number of Small Triangles
1	2
2	8
3	
4	

B. The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Answer:

C. The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Item Number: M022261C

#### **SCORING**

#### **Correct Response**

- · Correct general (i.e., literal) expression, e.g., 2n2, or equivalent expressed in words.
- 2 x 502 OR 2 x 50 x 50 OR 100 x 50 OR (50 + 50) x 50 OR equivalent expressed in words (disregard errors in computation).

#### **Partial Response**

- · Derives answer (5000) without showing work.
- · Other partially correct.

#### **Incorrect Response**

- 50 x 2 OR 100
- 50 x 50 OR 2,500
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

#### **Overall Percent Correct**

Chinese Taipei	49	
Korea, Republic of	48	
Hong Kong, SAR	45	
Singapore	44	
Japan	44	
Netherlands	36	
Australia	26	
Hungary	24	
Scotland	22	
Belgium (Flemish)	21	
England	20	
United States	19	
Sweden	17	
New Zealand	16	Ο
Estonia	15	0
Slovak Republic	14	0
International average	14	
Italy	14	0
Latvia	13	0
Slovenia	13	0
Serbia and Montenegro	11	$\blacksquare$
Lithuania	11	$\blacksquare$
Romania	11	Ο
Malaysia	10	$\blacksquare$
Israel	10	$\blacksquare$
Cyprus	10	•
Norway	9	$\blacksquare$
Russian Federation	9	$\blacksquare$
Armenia	8	$\blacksquare$
Indonesia	7	$\blacksquare$
Chile	6	$\blacksquare$
Jordan	5	$\blacksquare$
Egypt	5	$\blacksquare$
Palestinian Nat'l Auth.	5	$\blacksquare$
Macedonia, Republic of	4	* *
Philippines	4	$\blacksquare$
Bulgaria	4	$\blacksquare$
Bahrain	4	$\blacksquare$
Iran, Islamic Republic of	3	$\blacksquare$
Morocco	2	$\blacksquare$
Botswana	2	$\blacksquare$
South Africa	1	$\blacksquare$
Tunisia	1	$\blacksquare$
Lebanon	1	$\blacksquare$
Ghana	1	$\blacksquare$
Saudi Arabia	0	$\blacksquare$

#### Country average vs. International average:

Moldova, Republic of

Higher	
Not different	C
Lower	<b>T</b>

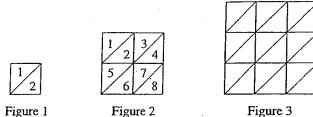
### Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

# **Student Responses**

### **Correct Response:**

The three figures below are divided into small congruent triangles.

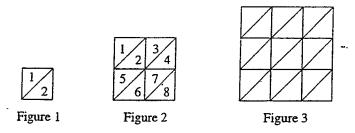


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

5000 Multiply the figure by itself and then multiply the answer you get by two.

#### **Partial Response:**

The three figures below are divided into small congruent triangles.



c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

500

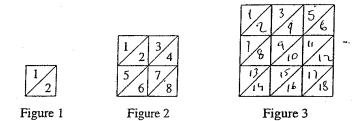
### Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

# **Student Responses** (continued)

### **Incorrect Response:**

The three figures below are divided into small congruent triangles.

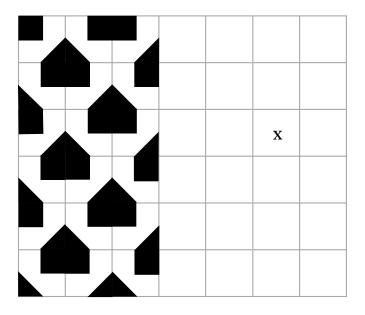


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Patterns	Using Concepts

### Geometry tiling: identify cell with letter

If the pattern on the grid below was continued, what letter would identify the orientation of the tile in the cell labeled **X**?



Item Number: M032744

### **SCORING**

#### **Correct Response**

• D (including drawing of tile D).

#### **Incorrect Response**

- A, B, or C (including drawings).
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Japan	73	
Korea, Republic of	66	
Singapore	62	
Sweden	57	
Hong Kong, SAR	57	
Netherlands	55	
Chinese Taipei	55	
Estonia	55	
Hungary	54	
Scotland	54	
Australia	53	
New Zealand	51	
Belgium (Flemish)	50	
United States	48	
England	47	
Slovak Republic	46	
Latvia	45	
Malaysia	44	
Slovenia	43	
Russian Federation	39	
Norway	36	O
Italy	34	0
Israel	34	0
International average	32	

international average		
Bulgaria	30	0
Romania	29	O
Lithuania	27	O
Cyprus	24	$\blacksquare$
Chile	23	
Bahrain	22	$\blacksquare$
Serbia and Montenegro	20	$\blacksquare$
Jordan	16	$\blacksquare$
Moldova, Republic of	15	* * * * * * * * * * * * * * * * * * *
Philippines	14	
Iran, Islamic Republic of	13	$\blacksquare$
Macedonia, Republic of	13	<b>* * * *</b>
Indonesia	11	$\blacksquare$
Lebanon	10	$\blacksquare$
South Africa	8	
Saudi Arabia	8	<b>▼</b>
Morocco	7	<b>▼</b>
Egypt	7	$\blacksquare$
Botswana	7	$\blacksquare$
Armenia	6	<b>▼</b>
Palestinian Nat'l Auth.	3	$\blacksquare$
Tunisia	2	$\blacksquare$

Country average vs. International average:

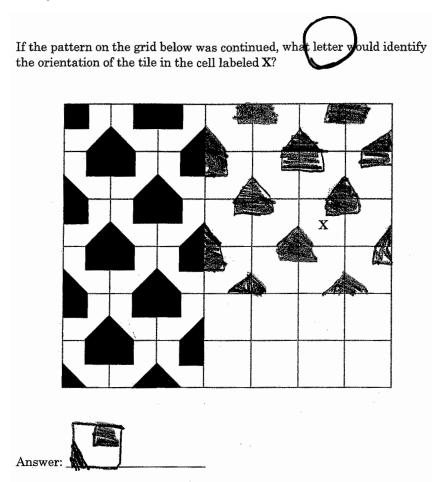
Higher
Not different
Lower

Geometry tiling: identify cell with letter (continued)

Item Number: M032744

# **Student Responses**

### **Correct Response:**



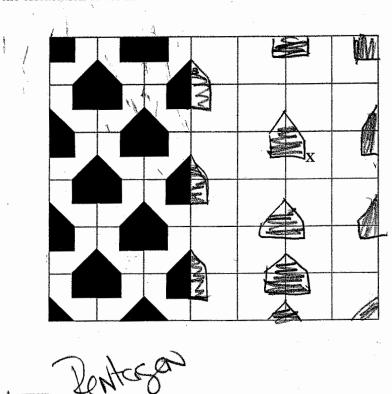
Geometry tiling: identify cell with letter (continued)

Item Number: M032744

# **Student Responses** (continued)

### **Incorrect Response:**

If the pattern on the grid below was continued, what letter would identify the orientation of the tile in the cell labeled X?



Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Relationships	Reasoning

# Sets of ordered pairs of numbers

(3, 6), (6, 15), (8, 21)

Which of these describes how to get the second number from the first number in every ordered pair above?

- Add 3
- (B) Subtract 3
- © Multiply by 2
- (D) Multiply by 2 and then add 3
- (E) Multiply by 3 and then subtract 3

Item Number: M012029

**Correct Response:** 

E

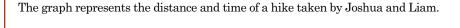
### **Overall Percent Correct**

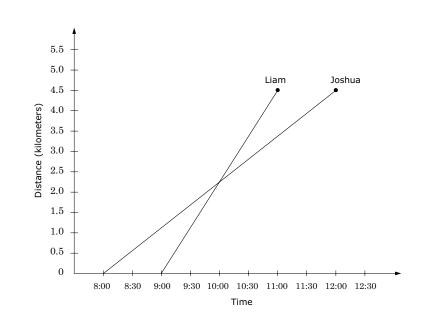
Korea, Republic of	85	<b>A</b>
Japan	76	<u> </u>
Hungary	75	
Estonia	74	<u> </u>
Chinese Taipei	71	
Singapore	71	
	71	
Hong Kong, SAR Latvia	71	
Australia	7 I 70	<b>A</b>
		<b>A</b>
Russian Federation	69	<u> </u>
Scotland	69	<b>A</b>
United States	68	<u> </u>
Netherlands	68	<b>A</b>
New Zealand	67	<u> </u>
England	64	<u> </u>
Lithuania	64	<b>A</b>
Belgium (Flemish)	62	<b>A</b>
Serbia and Montenegro	58	<b>A</b>
Israel	57	<b>A</b>
Slovak Republic	56	<b>A</b>
Bulgaria	54	0
Slovenia	53	0
Italy	51	0
Malaysia	51	0
International average	50	
Jordan	46	▼
Jordan Sweden	46 45	
Jordan Sweden Macedonia, Republic of	46 45 42	
Jordan Sweden	46 45 42 42	
Jordan Sweden Macedonia, Republic of Romania Norway	46 45 42	
Jordan Sweden Macedonia, Republic of Romania	46 45 42 42	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain	46 45 42 42 40	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana	46 45 42 42 40 39 38 36	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of	46 45 42 42 40 39 38	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana	46 45 42 42 40 39 38 36	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of	46 45 42 42 40 39 38 36 35	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia	46 45 42 42 40 39 38 36 35 34	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt	46 45 42 40 39 38 36 35 34	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines	46 45 42 40 39 38 36 35 34 33	*
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth.	46 45 42 40 39 38 36 35 34 33 33	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines	46 45 42 40 39 38 36 35 34 33 33 33	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia	46 45 42 40 39 38 36 35 34 33 33 31 26	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus	46 45 42 40 39 38 36 35 34 33 33 31 26 25	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile Ghana	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile Ghana Lebanon	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23 23	
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile Ghana Lebanon	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23 23	

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Relationships	Solving Routine Problems

### Intersection point of distance/time graphs





If they both started from the same place and walked in the same direction, at what time did they meet?

- A 8:00
- (B) 8:30
- © 9:00
- (D) 10:00
- (E) 11:00

Item Number: M012025

**Correct Response:** 

D

### **Overall Percent Correct**

Japan	96	
Hong Kong, SAR	90	<b>A</b>
Korea, Republic of	89	<b>A</b>
Estonia	88	<b>A</b>
Singapore	87	<b>A</b>
Hungary	84	
Lithuania	84	<b>A</b>
Sweden	84	<b>A</b>
Russian Federation	81	<b>A</b>
Netherlands	81	<b>A</b>
Chinese Taipei	81	<b>A</b>
England	81	<b>A</b>
United States	80	<b>A</b>
Slovenia	79	<b>A</b>
Latvia	78	<b>A</b>
Italy	75	<b>A</b>
Australia	75	<b>A</b>
Belgium (Flemish)	73	<b>A</b>
Scotland	73	<b>A</b>
New Zealand	72	<b>A</b>
Israel	72	<b>A</b>
Slovak Republic	70	<b>A</b>
Serbia and Montenegro	68	<b>A</b>
Bulgaria	67	<b>A</b>
A.I.	C 4	
Norway	64	0
International average	62	
International average Cyprus	<b>62</b> 58	0
International average Cyprus Romania	<b>62</b> 58 58	0
International average Cyprus Romania Macedonia, Republic of	<b>62</b> 58 58 53	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia	58 58 58 53	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan	58 58 58 53 53 52	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia	58 58 53 53 52 52	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile	58 58 53 53 52 52 51	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain	58 58 53 53 52 52 52 51	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt	58 58 53 53 52 52 51 50 47	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of	58 58 53 53 52 52 51 50 47	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia	58 58 53 53 52 52 51 50 47 47 46	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon	58 58 53 53 52 52 51 50 47 47 46 42	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana	58 58 53 53 52 52 51 50 47 47 46 42 41	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth.	58 58 53 53 52 52 51 50 47 47 46 42 41 39	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia	58 58 53 53 52 52 51 50 47 47 46 42 41 39 37	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines	58 58 53 53 52 52 51 50 47 47 46 42 41 39 37 31	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of	58 58 53 52 52 51 50 47 46 42 41 39 37 31 26	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana	52 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana South Africa	52 58 53 53 52 52 51 50 47 47 46 42 41 39 37 31 26 21	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana	52 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana South Africa	52 58 53 53 52 52 51 50 47 47 46 42 41 39 37 31 26 21	0 0 •

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Reasoning

### Test score frequency table

The table shows scores for a class on a 10-point test.

Test Score	Tally	Frequency
4	/	1
5	///	3
6	///// /	6
7	//	2
8	////	4
9	///	3
10	/	1

How many in the class had a score greater than 7?

- A 2
- B 8
- (c) 10
- (D) 12
- (F) 20

Item Number: M012037

**Correct Response:** 

В

### **Overall Percent Correct**

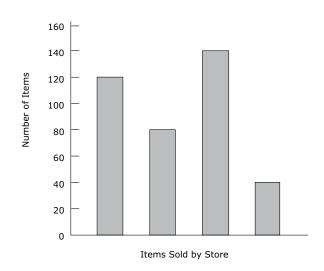
Korea, Republic of	85	
Netherlands	77	
Slovenia	68	
Belgium (Flemish)	67	
Sweden	65	<b>A</b>
United States	65	<u> </u>
Scotland	64	<u> </u>
Singapore	63	<u> </u>
Lithuania	61	
Israel	59	<b>A</b>
		<b>A</b>
New Zealand	59	
England	58	<b>A</b>
Estonia	58	<b>A</b>
Australia	56	<b>A</b>
Hungary	56	<b>A</b>
Serbia and Montenegro	56	<b>A</b>
Norway	55	
Indonesia	53	
Latvia	53	
Russian Federation	52	0
Bahrain	51	0
Chinese Taipei	51	0
Macedonia, Republic of	51	0
Slovak Republic	49	0
•	48	0
Hong Kong, SAR	48 48	0
Hong Kong, SAR International average	48	
Hong Kong, SAR International average Malaysia	<b>48</b> 47	0
Hong Kong, SAR International average Malaysia Romania	<b>48</b> 47 47	0
Hong Kong, SAR International average Malaysia Romania Jordan	48 47 47 46	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy	48 47 47 46 45	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan	48 47 47 46 45 44	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus	48 47 47 46 45 44 42	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt	48 47 47 46 45 44 42 42	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of	48 47 47 46 45 44 42 42 42	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia	48 47 47 46 45 44 42 42 42 39	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines	48 47 47 46 45 44 42 42 42 39 39	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia	48 47 47 46 45 44 42 42 42 39 39 36	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia	48 47 47 46 45 44 42 42 42 39 39 36 35	0 0 0 0 •
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth.	48 47 47 46 45 44 42 42 42 39 39 36	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia	48 47 47 46 45 44 42 42 42 39 39 36 35	0 0 0 0 •
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria	48 47 47 46 45 44 42 42 42 39 39 36 35 34	0 0 0 0 •
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana	48 47 47 46 45 44 42 42 42 39 39 36 35 34 33	0 0 0 0 0 0 0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile	48 47 47 46 45 44 42 42 42 39 36 35 34 33 33	0 0 0 0 0 0 0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon	48 47 47 46 45 44 42 42 42 39 36 35 34 33 33 31	0 0 0 0 0 0 0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon Moldova, Republic of	48 47 47 46 45 44 42 42 42 39 36 35 34 33 31 31	0 0 0 0 0 0 0 0 0
International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon Moldova, Republic of Ghana	48 47 47 46 45 44 42 42 42 39 36 35 34 33 31 31 27	0 0 0 0 0 0 0 0 0
International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon Moldova, Republic of Ghana Saudi Arabia	48 47 46 45 44 42 42 42 39 36 35 34 33 31 31 27 26	0 0 0 0 •

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Reasoning

### How many pencils sold from bar graph

The graph shows the number of pens, pencils, rulers, and erasers sold by a store in one week.



The names of the items are missing from the graph. Pens were the item most often sold, and fewer erasers than any other item were sold. More pencils than rulers were sold. How many pencils were sold?

- 40 (A)
- (B) 80
- (C) 120
- 140

Item Number: M022189

**Correct Response:** 

### **Overall Percent Correct**

Belgium (Flemish)	90	
Chinese Taipei	89	
Japan	88	
Hong Kong, SAR	88	
Korea, Republic of	87	
Malaysia	87	
Estonia	87	
Slovenia	86	
United States	86	
Sweden	86	
Netherlands	85	
Hungary	85	
Scotland	84	
Singapore	83	
Latvia	82	
Slovak Republic	80	
Russian Federation	80	
Italy	80	
Norway	78	
England	78	
New Zealand	78	
Lithuania	77	
Cyprus	76	
Australia	76	
Australia Israel	76 70	0
Australia		
Australia Israel	70	
Australia Israel International average	70 <b>67</b>	0
Australia Israel International average Bulgaria	70 <b>67</b> 67	0 0 0
Australia Israel International average Bulgaria Bahrain	70 <b>67</b> 67 66	0 0 0
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro	70 <b>67</b> 67 66 63	0 0 0
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of	70 <b>67</b> 67 66 63 62	0 0 0 •
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of	70 <b>67</b> 67 66 63 62 61	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of	70 <b>67</b> 67 66 63 62 61 59	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania	70 <b>67</b> 66 63 62 61 59 59	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan	70 67 67 66 63 62 61 59 59	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco	70 67 66 63 62 61 59 59 59	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia	70 67 67 66 63 62 61 59 59 59 53 51	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile	70 <b>67</b> 67 66 63 62 61 59 59 59 53 51 50	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt	70 67 67 66 63 62 61 59 59 59 53 51 50 49	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia	70 67 67 66 63 62 61 59 59 59 53 51 50 49	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth.	70 67 67 66 63 62 61 59 59 59 53 51 50 49 49	0 0 0 •
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia	70 67 67 66 63 62 61 59 59 59 53 51 50 49 49 48 45	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia Lebanon	70 67 67 66 63 62 61 59 59 59 53 51 50 49 49 48 45 42	○ ○ ○ ▼ ▼ ▼
Australia Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia Lebanon Tunisia	70 67 67 66 63 62 61 59 59 59 53 51 50 49 49 48 45 42 40	○ ○ ○ ▼ ▼ ▼

Country average vs. International average:

South Africa

Ghana

28

24

Higher Not different 0 • Lower

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Reasoning

### Phone plans: least expensive plan for Betty

Betty talks for less than 2 hours per month. Which plan would be less expensive for her?
Less expensive plan
Explain your answer in terms of both the monthly fee and free minutes.

#### Item Number: M032762

### **SCORING**

#### **Correct Response**

 Plan B with explanation that includes free minutes used and explicit reference to lower monthly fee for Plan B.

#### **Partial Response**

• Plan B with explicit reference to lower monthly fee and no reference to free minutes.

#### **Incorrect Response**

- Plan B with inadequate (only free minutes) or no explanation.
- Plan A with or without explanation.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Japan	49	<b>A</b>
England	45	
Australia	44	
Estonia	44	
Korea, Republic of	40	
Singapore	40	
Hungary	39	
Belgium (Flemish)	38	
Lithuania	37	
United States	37	
Scotland	36	
Israel	33	
New Zealand	30	
Netherlands	28	
Hong Kong, SAR	28	
Slovenia	27	
Sweden	27	
Malaysia	27	
Chinese Taipei	27	
Slovak Republic	26	
Italy	23	O
Latvia	22	0
International average	21	
Jordan	20	O
Bahrain	18	0
Bahrain Norway	18 18	O ▼
Bahrain Norway Romania	18 18 16	O ▼
Bahrain Norway Romania Russian Federation	18 18 16 15	O ▼
Bahrain Norway Romania Russian Federation Egypt	18 18 16 15	<ul><li>○</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus	18 18 16 15 14 13	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia	18 18 16 15 14 13	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro	18 18 16 15 14 13 12	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile	18 18 16 15 14 13 12 12	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria	18 18 16 15 14 13 12 12 12	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon	18 18 16 15 14 13 12 12 12 12	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines	18 18 16 15 14 13 12 12 12 11 11	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of	18 18 16 15 14 13 12 12 12 12 11 11	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia	18 18 16 15 14 13 12 12 12 12 11 11 10 8	<ul><li>○</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco	18 18 16 15 14 13 12 12 12 11 11 10 8 7	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth.	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6	· · · · · · · · · · · · · · · · · · ·
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7 6 5 4	· · · · · · · · · · · · · · · · · · ·
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7 6 5 4	· · · · · · · · · · · · · · · · · · ·
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia Ghana	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7 6 5 4 4 3	· · · · · · · · · · · · · · · · · · ·
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6 5 4 4 3 2	· · · · · · · · · · · · · · · · · · ·
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia Ghana Botswana	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7 6 5 4 4 3	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>

# Country average vs. International average:

Higher
Not different
Lower

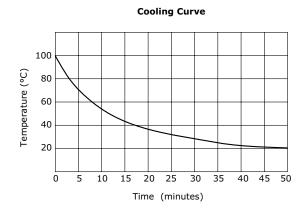
Phone plans: least expensive plan for Betty (continued) Item Number: M032762 **Student Responses Correct Response:** Betty talks for less than 2 hours per month. Which plan would be less expensive for her? Less expensive plan \_\_\_\_ Explain your answer in terms of both the monthly fee and free minutes. I he talks for under andhours and it pays the least selds Questions for Physic Plans continue. **Partial Response:** Betty talks for less than 2 hours per month. Which plan would be less expensive for her? Less expensive plan 8Explain your answer in terms of both the monthly fee and free minutes. **Incorrect Response:** Betty talks for less than 2 hours per month. Which plan would be less expensive for her? 

# Explain your answer in terms of both the monthly fee and free minutes. Since Betty could for 2hrs which is 120 min She will pay less for plan B. Because she will be free units.

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

### Graph of cooling water

A beaker of water which has reached boiling point is allowed to cool. The temperature of the water is recorded at five minute intervals, and a temperature-time graph is drawn.



About how many minutes did it take for the water to cool the first 20 degrees?

- A) 3
- (B) 8
- © 37
- (D) 50

Item Number: M022135

**Correct Response:** 

A

### **Overall Percent Correct**

Belgium (Flemish) Sweden Australia Estonia Hungary Scotland England Norway Singapore Netherlands United States New Zealand	70 62 59 57 56 55 55 54 54 53 52	
Lithuania Latvia Chinese Taipei Lebanon Italy Slovenia Japan Russian Federation Israel Indonesia Armenia Slovak Republic Malaysia	49 49 47 45 40 40 39 39 38 36 35 35 34 33	<b>A A A A A A A A A A</b>
International average	33	J
Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain Morocco Philippines Saudi Arabia Egypt Tunisia	33 32 30 28 26 25 21 18 18 17 14 14 13 12 11 10 10 9 8 4	

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

# Phone plans: cost of plans for Frank

Frank talks for 5 hours per month at the rocst him per month? Show your work.	night rate. What would each plan
Cost Per Month for Plan A:	zeds
Cost Per Month for Plan B:	zeds

Item Number: M032763

### **SCORING**

#### **Correct Response**

• Plan A= 140 zeds and Plan B = 375 zeds, with work shown.

#### **Partial Response**

- 140 zeds and 375 zeds with no work shown.
- Plan A or plan B correct with work shown but not both.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task).

# Overall Percent Correct

Singapore	27	
Japan	19	<b>A</b>
Chinese Taipei	18	
Hong Kong, SAR	15	
Korea, Republic of	15	
Netherlands	14	
Sweden	12	
Lithuania	11	
Belgium (Flemish)	11	<b>A</b>
Estonia	10	<b>A</b>
Hungary	10	<b>A</b>
England	8	0
United States	8	<u> </u>
New Zealand	7	0
Scotland	7	0
	, 7	0
Slovak Republic	-	
Australia	7	0
Israel	6	0
Malaysia	6	0
International average	6	
Latvia	6	O
Slovenia	5	O
Russian Federation	5	0
Romania	5	0
Norway	5	0
Bulgaria	4	0
Serbia and Montenegro	3	$\blacksquare$
Italy	3	$\blacksquare$
Moldova, Republic of	2	$\blacksquare$
Jordan	1	$\blacksquare$
Cyprus	1	•
Macedonia, Republic of	1	•
Indonesia	1	•
South Africa	1	<b>V</b>
Armenia	1	_
Palestinian Nat'l Auth.	1	•
Philippines	1	•
Chile	0	÷
Iran, Islamic Republic of	0	* * * * * * * * * * * * * * * * * * *
•	0	<b>*</b>
Egypt		<b>*</b>
Lebanon	0	<u>*</u>
Bahrain	0	<u>*</u>
Ghana	0	<b>V</b>
Tunisia	0	<b>V</b>
	0	_
Morocco		_
Botswana	0	* * * * * * * * * * * * * * * * * * *
		▼ ▼

# Country average vs. International average:

Higher
Not different
Lower

Phone plans: cost of plans for Frank (continued)

Item Number: M032763

# **Student Responses**

### **Correct Response:**

Frank talks for 5 hours per month at the night rate. What would each plan cost him per month? Show your work.

Cost Per Month for Plan A: \_\_\_\_\_zeds

Cost Per Month for Plan B: 375 zeds

Plan A - Ized - 180 mins free Plan B - 2zed - 120 mins Free

Plan A-3 hours free

120 zeds
140 zed

Plan B-2 hour free
360 zeas

### **Inorrect Response:**

Frank talks for 5 hours per month at the night rate. What would each plan cost him per month? Show your work.

Cost Per Month for Plan B: 255 zeds

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

### Phone plans: minutes talk by Darlene

Darlene signed up for the $Plan\ B$ , and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.
Minutes talked

#### Item Number: M032764

### **SCORING**

#### **Correct Response**

• 150 with work shown.

#### **Partial Response**

- 150 with no work shown.
- Correct method but with calculation error.
- 12 30 with calculations leading to 30.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Singapore Korea, Republic of Hong Kong, SAR Chinese Taipei Japan Netherlands Belgium (Flemish) Sweden Estonia England Hungary Lithuania Australia United States Slovak Republic New Zealand International average	28 22 21 20 19 17 13 12 11 11 9 9 8 8 8 7	
Latvia	6	0
Scotland Slovenia	6 5	0
Israel	5 5	0
Romania	5	0
Norway	5	0
Russian Federation	4	▼
Malaysia	4	Ť
Ghana	3	Ť
Bulgaria	3	<b>V</b>
Italy	3	* * * * * * * * * * * * * * * * * * *
Moldova, Republic of	2	▼
Jordan	2	▼
Cyprus	2	▼
Serbia and Montenegro	2	▼
Macedonia, Republic of	1	▼
Indonesia	1	▼
South Africa	1	▼
Bahrain	1	▼
Lebanon	0	▼
Tunisia	0	▼
Iran, Islamic Republic of	0	▼
Chile	0	<b>V</b>
Philippines	0	_
Armenia	0	
Palestinian Nat'l Auth.	0	▼
Morocco Botswana	0	<b>*</b>
Egypt	0	¥
Saudi Arabia	0	<b>*</b>

# Country average vs. International average:

Higher	
Not different	0
Lower	_

Phone plans: minutes talk by Darlene (continued)

Item Number: M032764

# **Student Responses**

### **Correct Response:**

Darlene signed up for the *Plan B*, and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.

Minutes talked 
$$150$$
  
 $75 \ 2)60 \ + 30$   
 $-15 \ -150$ 

#### **Partial Response:**

Darlene signed up for the *Plan B*, and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.

Minutes talked 
$$13\overline{25}$$
 naturals.

 $15 - 15 = 65$ 
 $32.5$ 
 $2\sqrt{65}$ 
 $32.5$ 
 $+120$ 
 $|32.5|$ 

### **Incorrect Response:**

Darlene signed up for the *Plan B*, and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Using Concepts

### Comparison of two average scores

Joe had three test scores of 78, 76, and 74, while Mary had scores of 72, 82, and 74. How did Joe's average (mean) score compare with Mary's average (mean) score?

- A Joe's was 1 point higher.
- (B) Joe's was 1 point lower.
- © Both averages were the same.
- (D) Joe's was 2 points higher.
- (E) Joe's was 2 points lower.

Item Number: M012006

**Correct Response:** 

0

### **Overall Percent Correct**

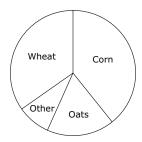
Chinese Taipei	90	<b>A</b>
Korea, Republic of	90	<u> </u>
Singapore	88	<u> </u>
Hong Kong, SAR	87	<u> </u>
Malaysia	84	<u> </u>
Japan	81	<u> </u>
Slovak Republic	78	<u> </u>
Lithuania	76	<u> </u>
Netherlands	76	<u> </u>
Latvia	75 75	<u> </u>
Tunisia	75 75	•
Slovenia	74	
United States	74	<u> </u>
Bulgaria	73	<u> </u>
Israel	73	<b>A</b>
Scotland	73	
Estonia	73 72	
Hungary	72	
Moldova, Republic of	72 72	0
Romania	72 72	<b>△</b>
Serbia and Montenegro Russian Federation	72	0
	70	
Australia	69	0
Belgium (Flemish)	69	0
Italy	69	0
	60	
International average	<b>68</b>	0
Macedonia, Republic of	68	0
Macedonia, Republic of Sweden	68 66	0
Macedonia, Republic of Sweden Armenia	68 66 65	0
Macedonia, Republic of Sweden Armenia Cyprus	68 66 65 65	0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of	68 66 65 65 64	0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco	68 66 65 65 64 64	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile	68 66 65 65 64 64 62	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway	68 66 65 65 64 64 62 61	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines	68 66 65 65 64 64 62 61	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt	68 66 65 65 64 64 62 61 61	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England	68 66 65 64 64 62 61 61 60	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand	68 66 65 64 64 62 61 61 60 60	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain	68 66 65 65 64 64 62 61 61 60 60 58	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia	68 66 65 64 64 62 61 61 60 60 58	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana	68 66 65 64 64 62 61 61 60 60 58 56	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan	68 66 65 64 64 62 61 60 60 60 58 56 53	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth.	68 66 65 64 64 62 61 60 60 60 58 56 53 52	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth. Ghana	68 66 65 64 64 62 61 60 60 60 58 56 53 52 51	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth. Ghana South Africa	68 66 65 64 64 62 61 60 60 58 56 53 52 51 43	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth. Ghana	68 66 65 64 64 62 61 60 60 60 58 56 53 52 51	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth. Ghana South Africa	68 66 65 64 64 62 61 60 60 58 56 53 52 51 43	0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Using Concepts

### Pie graph of crop distribution

The graph shows the distribution of crops grown in a certain country.



According to the information in the graph, which of these statements is true?

- (A) More oats are grown than wheat.
- B) Corn is more than one-half of the country's crop.
- © Oats are more than one-third of the country's crop.
- (D) The total crop of oats and wheat is greater than the corn crop.

Item Number: M012014

**Correct Response:** 

D

### **Overall Percent Correct**

Korea, Republic of	93	<b>A</b>
Japan	92	
Netherlands	88	
Australia	86	
Belgium (Flemish)	86	
Sweden	85	
Hong Kong, SAR	85	
Chinese Taipei	84	
Latvia	84	
Singapore	83	
Slovak Republic	82	
England	82	
Estonia	82	
Slovenia	82	
Lithuania	82	
Hungary	81	
New Zealand	81	
United States	81	
Scotland	81	
Israel	79	<b>A</b>
Norway	78	<b>A</b>
Russian Federation	78	<b>A</b>
Cyprus	76	
Italy	74	0
Romania	72	0
International average	71	
Tunisia	71	0
Bulgaria	70	0
Egypt	69	0
Moldova, Republic of	67	0
Morocco	67	0
Jordan	66	▼
Macedonia, Republic of	65	•
Serbia and Montenegro	65	•
Iran, Islamic Republic of	64	•

Country average vs. International average:

Malaysia

Bahrain

Armenia

Saudi Arabia

Botswana Philippines

Lebanon

Indonesia

South Africa

Ghana

Chile

Palestinian Nat'l Auth.

63

63

61

60

57 52

51

50

49

45

41

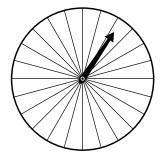
33

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Content Domain	Main Topic	Cognitive Domain
DATA	Uncertainty and Probability	Reasoning

### Most likely sector on spinner

The figure below shows a spinner with 24 sectors. When someone spins the arrow, it is equally likely to stop on any sector.



 $\frac{1}{8}$  of the sectors are blue,  $\frac{1}{24}$  are purple,  $\frac{1}{2}$  are orange, and  $\frac{1}{3}$  are red. If a person spins the arrow, on which color sector is the spinner LEAST likely to stop?

- (A) blue
- (B) purple
- © orange
- (D) red

Item Number: M022252

**Correct Response:** 

В

### **Overall Percent Correct**

Hong Kong, SAR	87	<b>A</b>
Chinese Taipei	85	<b>A</b>
Netherlands	85	<u> </u>
Japan	82	<u> </u>
Sweden	81	<u> </u>
Belgium (Flemish)	81	<b>A</b>
England	79	
Singapore	79	<u> </u>
Korea, Republic of	79	<u> </u>
United States	78	<u> </u>
Australia	78	<b>A</b>
Hungary	76	<u> </u>
Scotland	76	<b>A</b>
Israel	74	
Slovenia	74	<u> </u>
Norway	73	<u> </u>
Estonia	73	<u> </u>
Latvia	71	<u> </u>
New Zealand	71	<u> </u>
Slovak Republic	69	<b>A</b>
Cyprus	69	
Lithuania	67	<u> </u>
Serbia and Montenegro	66	<b>A</b>
Malaysia	65	<b>A</b>
Bulgaria	60	0
Russian Federation	60	0
Russian Federation International average		0
Russian Federation	60 <b>60</b>	0
Russian Federation International average Italy Romania	60 <b>60</b> 58 57	0
Russian Federation International average Italy	60 <b>60</b> 58	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia	60 60 58 57 54	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of	60 60 58 57 54 47	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan	60 60 58 57 54 47 46	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines	60 60 58 57 54 47 46 46 43	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of	60 60 58 57 54 47 46 46	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines	60 58 57 54 47 46 46 43 43	0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt	60 58 57 54 47 46 46 43 43	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon	60 58 57 54 47 46 43 43 43 42	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain	60 58 57 54 47 46 46 43 43 43 42 41	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth.	60 58 57 54 47 46 46 43 43 43 42 41 40	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco	58 57 54 47 46 46 43 43 43 42 41 40 39	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile	58 57 54 47 46 46 43 43 43 42 41 40 39 38	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia	58 57 54 47 46 46 43 43 42 41 40 39 38 37	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana Saudi Arabia	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana Saudi Arabia Ghana	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34 34 34	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Uncertainty and Probability	Reasoning

#### In a school there were 1200 students

In a school there were 1,200 students (boys and girls). A sample of 100 students was selected at random, and 45 boys were found in the sample. Which of these is most likely to be the number of boys in the school?

- (A) 450
- B) 500
- © 540
- (D) 600

Item Number: M032271

**Correct Response:** 

0

### **Overall Percent Correct**

Singapore Netherlands Chinese Taipei Korea, Republic of Belgium (Flemish)	80 78 77 75	<b>A</b>
Chinese Taipei Korea, Republic of	77	
Korea, Republic of		
	75	
Relaium (Flemish)		
pergranti (i icitilisti)	71	
Japan	66	
Estonia	61	
Sweden	61	
United States	60	
Hungary	56	
Australia	56	
New Zealand	55	
Lithuania	55	
Italy	55	
Scotland	53	
Russian Federation	52	
Latvia	50	0
Malaysia	49	0
England	49	0
Israel	47	0
International average	47	
Norway	46	0
Slovak Republic	45	0
Serbia and Montenegro	44	0
Moldova, Republic of	44	0
Slovenia	44	0
Bulgaria	43	0
Cyprus	43	▼
Lebanon	41	▼
Armenia	39	•
Tunisia	39	▼
Jordan	39	•
Romania	38	•
Egypt	38	•
Macedonia, Republic of	36	$\blacksquare$
Iran, Islamic Republic of	35	•
Indonesia	34	$\blacksquare$
Chile	32	$\blacksquare$
Palestinian Nat'l Auth.	32	$\blacksquare$
Philippines	31	▼
Morocco	28	▼
Botswana	28	▼
Saudi Arabia	26	▼
Bahrain	23	▼
South Africa	23	<b>* * *</b>
Ghana	23	▼
Tunisia Jordan Romania Egypt Macedonia, Republic of	39 39 38 38 36	* * * * * * *

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Uncertainty and Probability	Solving Routine Problems

### Number of students from probability

In an eighth-grade class of 30 students, the probability that a student chosen at random will be less than 13 years old is  $\frac{1}{5}$ . How many students in the class are less than 13 years old?

- (A) Two
- (B) Three
- © Four
- D Five
- (E) Six

Item Number: M022146

**Correct Response:** 

E

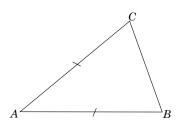
### **Overall Percent Correct**

Korea, Republic of	89	<b>A</b>
Singapore	87	
Chinese Taipei	86	<b>A</b>
Japan	86	<b>A</b>
Hong Kong, SAR	84	<b>A</b>
Netherlands	82	
Belgium (Flemish)	79	
Sweden	71	
Malaysia	69	
Scotland	66	
England	63	<b>A</b>
Armenia	62	
Australia	60	
Latvia	59	<b>A</b>
United States	58	<b>A</b>
Estonia	57	<b>A</b>
Italy	56	<b>A</b>
Hungary	55	<b>A</b>
Israel	54	<b>A</b>
New Zealand	54	0
Cyprus	53	0
Slovenia	53	0
Lithuania	52	0
	51	0
Russian Federation		
	50	
Russian Federation Norway Bulgaria		0
Norway	50	0
Norway Bulgaria	50 50	0 0
Norway Bulgaria International average	50 50 <b>50</b>	0 0
Norway Bulgaria International average Slovak Republic	50 50 <b>50</b> 50	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro	50 50 <b>50</b> 50 46	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of	50 50 <b>50</b> 50 46 42	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania	50 50 50 50 46 42 39	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of	50 50 50 50 46 42 39 37	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan	50 50 50 50 46 42 39 37 33	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt	50 50 50 50 46 42 39 37 33 33	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana	50 50 50 50 46 42 39 37 33 33 33	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of	50 50 50 46 42 39 37 33 33 32 32	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines	50 50 50 46 42 39 37 33 33 32 32	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of	50 50 50 46 42 39 37 33 33 32 32 32 31	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth.	50 50 50 46 42 39 37 33 33 32 32 32 31 28	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon	50 50 50 50 46 42 39 37 33 32 32 32 32 31 28 28	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28 26	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa Bahrain	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28 26 24	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa Bahrain Chile	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28 26 24 23	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa Bahrain Chile Tunisia	50 50 50 46 42 39 37 33 32 32 32 32 32 32 32 28 28 26 24 23 22	0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Knowing Facts and Procedures

### Draw a line to divide triangle ABC



The triangle ABC has AB = AC.

Draw a line to divide triangle ABC into two congruent triangles.

Item Number: M032403

#### **SCORING**

#### **Correct Response**

• Line drawn from A to (approximate) midpoint of BC.

### **Incorrect Response**

- · Line drawn from C or B.
- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

# Overall Percent Correct

Singapore	88	
Japan	86	<b>A</b>
Korea, Republic of	84	
Hong Kong, SAR	79	
Armenia	77	<b>A</b>
Russian Federation	73	<b>A</b>
Belgium (Flemish)	72	$\blacktriangle$
Chinese Taipei	71	$\blacktriangle$
Latvia	71	$\blacktriangle$
Lithuania	70	<b>A</b>
Estonia	69	<b>A</b>
Israel	66	<b>A</b>
Bahrain	65	<b>A</b>
Romania	62	<b>A</b>
Bulgaria	61	<b>A</b>
Slovak Republic	60	<b>A</b>
Netherlands	59	<b>A</b>
Moldova, Republic of	56	0
Lebanon	55	0
Australia	55	0
United States	54	0
Slovenia	53	0
Tunisia	53	0
Hungary	53	0
Malaysia	52	0
Malaysia International average	52	
Malaysia International average Cyprus	<b>52</b> 51	0
Malaysia International average Cyprus England	<b>52</b> 51 48	0
Malaysia International average Cyprus England New Zealand	<b>52</b> 51 48 48	0 0 0
Malaysia International average Cyprus England New Zealand Jordan	52 51 48 48 47	0 0 0
Malaysia International average Cyprus England New Zealand Jordan Scotland	52 51 48 48 47 47	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy	52 51 48 48 47 47 45	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of	52 51 48 48 47 47 45 43	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway	52 51 48 48 47 47 45 43 42	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco	52 51 48 48 47 47 45 43 42 41	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro	52 51 48 48 47 47 45 43 42 41 40	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt	52 51 48 48 47 47 45 43 42 41 40 40	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia	52 51 48 48 47 47 45 43 42 41 40 40 39	0 0 0
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth.	52 51 48 48 47 47 45 43 42 41 40 40 39 36	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of	52 51 48 47 47 45 43 42 41 40 40 39 36 35	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia	52 51 48 47 47 45 43 42 41 40 40 39 36 35 26	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden	52 51 48 47 47 45 43 42 41 40 40 39 36 35 26 20	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana Philippines	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19 14 11	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana Philippines	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19 14 11	O O O ▼

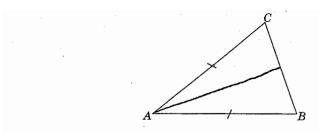
Country average vs. International average:

# Draw a line to divide triangle ABC (continued)

Item Number: M032403

# **Student Responses**

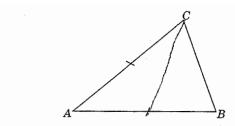
#### **Correct:**



The triangle ABC has AB = AC.

Draw a line to divide triangle ABC into two congruent triangles.

#### **Incorrect:**



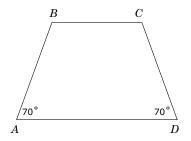
The triangle ABC has AB = AC.

Draw a line to divide triangle ABC into two congruent triangles.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Reasoning

### Property of congruent trapezoids

ABCD is a trapezoid.



Another trapezoid, GHIJ (not shown), is congruent (the same size and shape) to ABCD. Angles G and J each measure 70°. Which of these could be true?

- $\widehat{A}$  GH = AB
- (B) Angle H is a right angle.
- (C) All sides of *GHIJ* are the same length.
- (D) The perimeter of *GHIJ* is 3 times the perimeter of *ABCD*.
- (E) The area of GHIJ is less than the area of ABCD.

Item Number: M012015

**Correct Response:** 

Α

### **Overall Percent Correct**

Korea, Republic of	86	
Estonia	84	<b>A</b>
Japan	83	<b>A</b>
Hong Kong, SAR	81	<b>A</b>
Singapore	81	<b>A</b>
Chinese Taipei	79	<b>A</b>
Latvia	77	
Russian Federation	77	<b>A</b>
Lithuania	74	<b>A</b>
Belgium (Flemish)	73	
Slovak Republic	73	<b>A</b>
Netherlands	69	<b>A</b>
United States	69	<b>A</b>
Hungary	69	<b>A</b>
Slovenia	68	<b>A</b>
Romania	68	<b>A</b>
Italy	67	<b>A</b>
Bulgaria	67	
Australia	66	<b>A</b>
Israel	66	<b>A</b>
Scotland	64	0
Malaysia	64	0
Moldova, Republic of	63	0
Sweden	62	0
Morocco	62	0
Morocco Tunisia	62 62	0
		0
Tunisia New Zealand Cyprus	62 61 61	0
Tunisia New Zealand Cyprus International average	62 61 61	0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of	62 61 61 <b>60</b>	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia	62 61 61 <b>60</b> 60 59	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway	62 61 61 <b>60</b> 60 59 58	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England	62 61 61 <b>60</b> 60 59 58 57	0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia	62 61 61 <b>60</b> 60 59 58 57 56	
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro	62 61 61 <b>60</b> 60 59 58 57 56	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon	62 61 61 <b>60</b> 59 58 57 56 56	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain	62 61 61 60 60 59 58 57 56 56 55 54	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan	62 61 61 60 60 59 58 57 56 56 55 54 48	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of	62 61 61 60 59 58 57 56 56 55 54 48 45	
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth.	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt	62 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 37 35 34	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana Philippines	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34 30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana Philippines Ghana	62 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34 30 25	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana Philippines	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34 30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

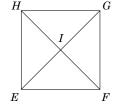
Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Using Concepts

### False statement of congruent triangles

In square *EFGH*, which of these is FALSE?

- (A)  $\Delta EIF$  and  $\Delta EIH$  are congruent.
- (B)  $\Delta GHI$  and  $\Delta GHF$  are congruent.
- $\bigcirc$   $\Delta EFH$  and  $\Delta EGH$  are congruent.
- $\bigcirc$   $\Delta EIF$  and  $\Delta GIH$  are congruent.



Item Number: M012005

**Correct Response:** 

В

### **Overall Percent Correct**

Korea, Republic of	86	<b>A</b>
Japan	85	
Chinese Taipei	82	
Estonia	82	
Hong Kong, SAR	79	
Latvia	78	
Bulgaria	74	
Russian Federation	74	
Lithuania	73	
Netherlands	72	
Singapore	72	
Cyprus	69	
Belgium (Flemish)	68	
Slovak Republic	68	
Romania	64	
Armenia	62	
Israel	62	
Sweden	62	
Slovenia	61	
Italy	58	0
Morocco	58	0
Bahrain	57	0
International average	56	
Moldova, Republic of	56	0
Indonesia	55	0
United States	55	0
Jordan	54	0
Iran, Islamic Republic of	53	<ul><li>○</li><li>▼</li></ul>
Malaysia	50	•
Tunisia	49	•
Egypt	46	•

Norway

Hungary

Lebanon

Scotland

Australia

New Zealand

Philippines

South Africa

Botswana

England Saudi Arabia

Chile

Macedonia, Republic of

Serbia and Montenegro

Palestinian Nat'l Auth.

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46

45

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45

44

44

43

42

41

39 35

35

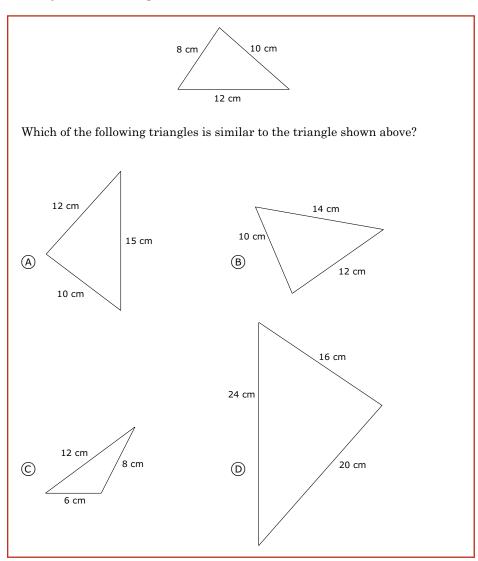
28

26 25

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Using Concepts

### Identify similar triangles



Item Number: M032261

**Correct Response:** 

D

# **Overall Percent Correct**

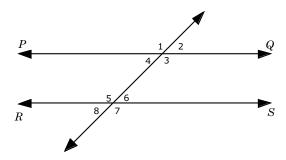
Korea, Republic of	83	
Hong Kong, SAR	76	<u> </u>
Singapore Singapore	75	
Japan	70	
Chinese Taipei	68	
Russian Federation	61	<u> </u>
Netherlands	60	_
Belgium (Flemish)	59	<u> </u>
Iran, Islamic Republic of	54	_
Hungary	51	<u> </u>
Malaysia	51	
Lithuania	50	
Latvia	49	
Estonia	46	
United States	46	
		0
Lebanon	46	_
Italy	44	0
England	43	0
International average	42	
Jordan	41	O
Philippines	41	0
Sweden	41	O
Australia	40	0
Romania	39	0
Romania Serbia and Montenegro	38	0
		O ▼
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of	38	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand	38 38	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of	38 38 38	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand	38 38 38 37	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic	38 38 38 37 37	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia	38 38 38 37 37 36	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel	38 38 38 37 37 36 36	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of	38 38 38 37 37 36 36 36	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus	38 38 37 37 36 36 36 34	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway	38 38 37 37 36 36 36 34 34	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt	38 38 37 37 36 36 36 34 34	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia	38 38 37 37 36 36 36 34 34 34	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria	38 38 37 37 36 36 36 34 34 34 33	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia	38 38 37 37 36 36 36 34 34 34 33 31 30	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland	38 38 37 37 36 36 36 34 34 34 33 31 30 29	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain	38 38 37 37 36 36 36 34 34 33 31 30 29 27	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana	38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana	38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana South Africa	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23 23 21	<ul><li>○</li><li>○</li><li>○</li><li>▼</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana South Africa Morocco	38 38 38 37 37 36 36 36 34 34 34 33 31 30 29 27 25 23 23 21 21	· · · · · · · · · · · · · · · · · · ·

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Knowing Facts and Procedures

### Sum of angles equal to 180 degrees

In this figure, PQ and RS are parallel.



Of the following, which pair of angles has the sum of 180°?

- $\bigcirc$   $\angle$  5 and  $\angle$  7
- $\bigcirc$  B)  $\angle 3$  and  $\angle 6$
- $\bigcirc$   $\angle 1$  and  $\angle 5$
- $\bigcirc$   $\angle 1$  and  $\angle 7$
- (E)  $\angle 2$  and  $\angle 8$

Item Number: M022142

**Correct Response:** 

В

### **Overall Percent Correct**

Japan		
	83	
Korea, Republic of	81	
Hong Kong, SAR	79	
Singapore	72	
Chinese Taipei	67	
Estonia	63	
Belgium (Flemish)	62	<u> </u>
Latvia	56	
Russian Federation	54	_
Australia	49	<u> </u>
Lithuania	49	<u> </u>
England	48	0
Israel	47	0
Bulgaria	47	0
Moldova, Republic of	47	0
Hungary	47	0
Slovak Republic	46	0
Bahrain	46	0
Netherlands	46 45	0
New Zealand	45	0
Serbia and Montenegro	43	0
International average	43	
Armenia	43 42	0
Cyprus	42 41	0
Scotland		0
Slovenia	41	Ο
Slovenia Romania	41 41	O O
Slovenia Romania Malaysia	41 41 41	0 0 0
Slovenia Romania Malaysia Lebanon	41 41 41 38	0 0 0
Slovenia Romania Malaysia Lebanon Egypt	41 41 41 38 37	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Slovenia Romania Malaysia Lebanon Egypt United States	41 41 41 38 37 37	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Slovenia Romania Malaysia Lebanon Egypt United States Italy	41 41 41 38 37 37 36	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of	41 41 41 38 37 37 36 35	0 0 • • •
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth.	41 41 41 38 37 37 36 35 34	0 0 0 • •
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway	41 41 41 38 37 37 36 35 34 34	0 0 0 • • •
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden	41 41 41 38 37 37 36 35 34 34 32	0 0 0 * * * * *
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway	41 41 41 38 37 37 36 35 34 34	0 0 0 * * * * *
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden	41 41 41 38 37 37 36 35 34 34 32	0 0 0 * * * * *
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia	41 41 41 38 37 37 36 35 34 34 32 31	0 0 0 * * * * *
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan	41 41 41 38 37 36 35 34 34 32 31 29	0 0 0 * * * * * * * *
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia	41 41 41 38 37 36 35 34 34 32 31 29 28	0 0 0 V V V V V V V V V V V V V V V V V
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco	41 41 41 38 37 36 35 34 34 32 31 29 28 28	0 0 0 1 1 1 1 1 1
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines	41 41 41 38 37 36 35 34 34 32 31 29 28 28 26	0 0 0 1 1 1 1 1 1
Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of	41 41 41 38 37 36 35 34 32 31 29 28 28 26 25	O O
Slovenia Romania Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of Chile	41 41 41 38 37 36 35 34 32 31 29 28 28 26 25 25	0 0 0 1 1 1 1 1 1
Slovenia Romania Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of Chile South Africa	41 41 41 38 37 36 35 34 32 31 29 28 26 25 25 23	O O

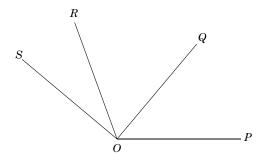
Country average vs. International average:

Botswana

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Reasoning

### Measure of angle in adjacent angles

In the figure, the measure of  $\angle POR$  is 110°, the measure of  $\angle QOS$  is 90°, and the measure of  $\angle POS$  is 140°.



What is the measure of  $\angle QOR$ ?

Answer:	
---------	--

Item Number: M022202

### **SCORING**

#### **Correct Response**

• 60

### **Incorrect Response**

- 30 OR 50 [140° 110° or 140° 90°]
- 55 [110 ÷ 2]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# Overall Percent Correct

Korea, Republic of	63	<b>A</b>
Japan	60	
Singapore	58	
Hong Kong, SAR	57	
Chinese Taipei	49	
Hungary	44	
Norway	41	
Russian Federation	40	
Armenia	39	
Latvia	37	
Belgium (Flemish)	36	
Slovak Republic	36	
Estonia	36	
Serbia and Montenegro	35	
Romania	34	
Bulgaria	34	
Israel	32	
Moldova, Republic of	32	O
Malaysia	32	
Netherlands	28	O
New Zealand	28	Ο
International average	28	

international average		
Lithuania	27	0
Macedonia, Republic of	26	O
Australia	26	0
Lebanon	26	O
Italy	25	0
Slovenia	25	0
England	23	$\blacksquare$
United States	22	$\blacksquare$
Cyprus	21	$\blacksquare$
Sweden	20	$\blacksquare$
Tunisia	18	$\blacksquare$
Scotland	17	$\blacksquare$
Palestinian Nat'l Auth.	16	$\blacksquare$
Indonesia	16	$\blacksquare$
Bahrain	16	$\blacksquare$
Egypt	15	$\blacksquare$
Jordan	13	$\blacksquare$
Morocco	11	$\blacksquare$
Philippines	11	$\blacksquare$
Iran, Islamic Republic of	11	$\blacksquare$
Chile	10	$\blacksquare$
Botswana	9	$\blacksquare$
Saudi Arabia	6	$\blacksquare$
South Africa	4	$\blacksquare$

# Country average vs. International average:

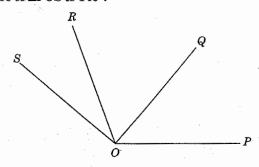
# Measure of angle in adjacent angles (continued)

Item Number: M022202

# **Student Responses**

### **Correct Response:**

In the figure, the measure of  $\angle POR$  is 110°, the measure of  $\angle QOS$  is 90°, and the measure of  $\angle POS$  is 140°.

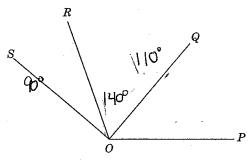


What is the measure of  $\angle QOR$ ?

Answer: \_\_\_\_\_\_\_\_\_

### **Incorrect Response:**

In the figure, the measure of  $\angle POR$  is 110°, the measure of  $\angle QOS$  is 90°, and the measure of  $\angle POS$  is 140°.



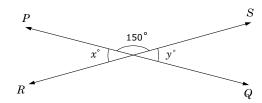
What is the measure of  $\angle QOR$ ?

Answer: 50°

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Solving Routine Problems

# Sum of angles from intersecting lines

In the figure, PQ and RS are intersecting straight lines.



What is the value of x + y?

- A 15
- (B) 30
- © 60
- D 180
- **E** 300

Item Number: M012039

**Correct Response:** 

### **Overall Percent Correct**

Korea, Republic of	84	
Singapore	84	
Hong Kong, SAR	83	
Chinese Taipei	82	
Japan	78	
Malaysia	69	
Estonia	67	
Latvia	66	
Russian Federation	64	
Belgium (Flemish)	59	
Serbia and Montenegro	59	
Israel	58	
Romania	58	
Slovenia	58	
Bulgaria	57	
Netherlands	57	
Lebanon	55	
Lithuania	54	O
Australia	52	O
Moldova, Republic of	52	O
Slovak Republic	52	Ο
England	50	0
International average	50	

England	50	O
International average	50	
Italy	50	0
Hungary	48	0
Iran, Islamic Republic of	48	0
United States	47	<ul><li>○</li><li>▼</li></ul>
Cyprus	46	•
New Zealand	46	0
Macedonia, Republic of	45	•
Armenia	44	•
Egypt	43	* * * * * * * * * * * * * * * * * * *
Sweden	43	•
Scotland	41	•
Tunisia	41	
Jordan	40	•
Palestinian Nat'l Auth.	40	
Indonesia	38	
Norway	34	
Bahrain	33	•
Morocco	33	* * * * * * * * * * * * * * * * * * *
Chile	32	
Philippines	27	
Botswana	26	•
Saudi Arabia	26	$\blacksquare$
Ghana	21	
South Africa	16	•

Country average vs. International average:

0

 $\blacksquare$ 

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Knowing Facts and Procedures

### Point on a line defined by two points

A straight line passes through the points (2,3) and (4,7). Which of these points is also on the line?

- (0,2)
- (B) (1,2)
- (C) (2,4)
- $\bigcirc$  (3,5)
- (4,5)

Item Number: M022016

**Correct Response:** 

D

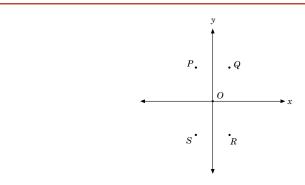
# **Overall Percent Correct**

Netherlands England Scotland Korea, Republic of Singapore Chinese Taipei Sweden Australia United States Japan Norway Hong Kong, SAR Hungary Lithuania New Zealand Belgium (Flemish) Russian Federation Estonia Malaysia Latvia	66 62 56 56 54 53 51 50 49 47 46 44 43 42 40 38 37	
Cyprus International average	36 <b>35</b>	0
Slovenia	35	0
Israel Serbia and Montenegro Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain Iran, Islamic Republic of Ghana Saudi Arabia South Africa Tunisia	34 31 31 30 29 28 28 27 26 26 25 24 23 22 22 21 21 20 19 19 8	

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Knowing Facts and Procedures

# Which point could have coordinates (2, -4)



In the coordinate plane above, which point could have coordinates (2,-4)?

- $\bigcirc$  P
- $\bigcirc$   $\bigcirc$   $\bigcirc$   $\bigcirc$
- $\bigcirc$  R
- $\bigcirc$  S

Item Number: M032588

**Correct Response:** 

0

### **Overall Percent Correct**

Chinese Taipei	87	<b>A</b>
Japan	86	<b>A</b>
Korea, Republic of	83	<b>A</b>
Estonia	81	<b>A</b>
Russian Federation	79	<b>A</b>
Singapore	77	<b>A</b>
Netherlands	75	<b>A</b>
Hong Kong, SAR	74	<b>A</b>
Hungary	74	<b>A</b>
Lithuania	73	<b>A</b>
Latvia	72	<b>A</b>
United States	72	<b>A</b>
Malaysia	71	<b>A</b>
Iran, Islamic Republic of	69	<b>A</b>
Belgium (Flemish)	68	<b>A</b>
England	67	<b>A</b>
Lebanon	66	<b>A</b>
Scotland	65	<b>A</b>
Israel	62	<b>A</b>
Serbia and Montenegro	61	<b>A</b>
Bulgaria	60	0
Romania	59	0
Slovenia	58	0
Macedonia, Republic of	58	0
New Zealand	58	0
New Zealand Australia	58 58	0
Australia Italy	58 57	
Australia Italy International average	58 57 <b>56</b>	0
Australia Italy International average Jordan	58 57 <b>56</b> 55	0 0
Australia Italy International average Jordan Armenia	58 57 <b>56</b> 55 53	0 0
Australia Italy International average Jordan Armenia Moldova, Republic of	58 57 <b>56</b> 55 53 53	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia	58 57 <b>56</b> 55 53 53	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt	58 57 <b>56</b> 55 53 53 47	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden	58 57 <b>56</b> 55 53 53 53 47 45	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic	58 57 <b>56</b> 55 53 53 53 47 45 43	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway	58 57 <b>56</b> 55 53 53 53 47 45 43	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines	58 57 <b>56</b> 55 53 53 47 45 43 43	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain	58 57 <b>56</b> 55 53 53 47 45 43 41 38	0 0 0 0 0 0 V
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth.	58 57 <b>56</b> 55 53 53 47 45 43 41 38 34	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia	58 57 56 55 53 53 47 45 43 41 38 34 32	0 0 0 0 0 0 V
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31	0 0 0 0 0 0 V
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30	0 0 0 0 0 0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28	0 0 0 0 0 0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28	0 0 0 0 0 0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa Botswana	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28 28	0 0 0 0 0 0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa Botswana Chile	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28 26 25	0 0 0 0 0 0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa Botswana	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28 28	0 0 0 0 0 0 V

Country average vs. International average:

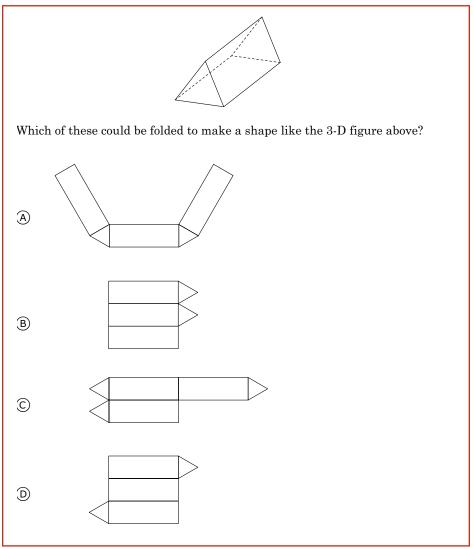
0

 $\blacksquare$ 

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Using Concepts

# Which could be folded to make a 3-D figure



Item Number: M032489

Correct Response: D

### **Overall Percent Correct**

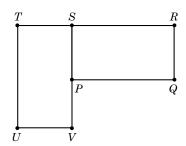
Japan	97	
Chinese Taipei	96	<u> </u>
Korea, Republic of	94	_ _
Hong Kong, SAR	94	<b>A</b>
Singapore	94	$\blacktriangle$
Netherlands	89	<b>A</b>
Malaysia	89	<b>A</b>
New Zealand	88	<b>A</b>
Estonia	87	<b>A</b>
Belgium (Flemish)	87	<b>A</b>
Australia	86	<b>A</b>
England	86	<b>A</b>
Scotland	86	<b>A</b>
Hungary	85	<b>A</b>
Lithuania	83	<b>A</b>
Slovak Republic	81	<b>A</b>
Serbia and Montenegro	77	<b>A</b>
United States	76	<b>A</b>
Sweden	76	<b>A</b>
Slovenia	75	<b>A</b>
Italy	73	<b>A</b>
Latvia	72	0
Norway	71	0
Bulgaria	70	0
Russian Federation	69	0
_	69 68	0
Russian Federation		
Russian Federation Indonesia International average Romania	68	0
Russian Federation Indonesia International average	68 <b>68</b>	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus	68 <b>68</b> 68	0 0 0
Russian Federation Indonesia International average Romania Chile	68 68 68 67 63 63	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus	68 68 68 67 63 63 62	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of	68 68 68 67 63 63 62 61	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon	68 68 68 67 63 63 62 61 59	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco	68 68 67 63 63 62 61 59	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of	68 68 68 67 63 63 62 61 59 58	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia	68 68 68 67 63 63 62 61 59 58 55	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of	68 68 68 67 63 63 62 61 59 58	0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of	68 68 68 67 63 63 62 61 59 58 55	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain	68 68 67 63 63 62 61 59 58 55 52	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of	68 68 67 63 63 62 61 59 58 55 52 51 49 46 46	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana	68 68 67 63 63 62 61 59 58 55 52 51 49 46 46 43	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines	68 68 67 63 63 62 61 59 58 55 52 51 49 46 46 43 40	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia	68 68 67 63 63 62 61 59 58 55 52 51 49 46 46 43 40 40	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia Egypt	68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40 31	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia Egypt South Africa	68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40 31 28	0 0 0
Russian Federation Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia Egypt	68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40 31	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Symmetry and Transformations	Reasoning

### Center point of rotation of rectangle

Rectangle PQRS can be rotated (turned) onto rectangle UVST.



What point is the center of rotation?

- $\bigcirc$  P
- $\bigcirc$  R
- $\bigcirc$  S
- $\bigcirc$  T
- $\bigcirc$  V

Item Number: M022154

**Correct Response:** 

0

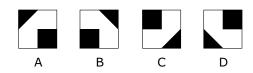
### **Overall Percent Correct**

Japan	79	<b>A</b>
Chinese Taipei	76	$\blacktriangle$
Korea, Republic of	75	<b>A</b>
Hong Kong, SAR	73	<b>A</b>
Slovenia	71	<b>A</b>
Estonia	71	<b>A</b>
Netherlands	65	<b>A</b>
Singapore	64	<b>A</b>
Hungary	63	<b>A</b>
England	63	<b>A</b>
Belgium (Flemish)	62	<b>A</b>
Latvia	61	<b>A</b>
Sweden	60	<b>A</b>
New Zealand	59	<b>A</b>
Lithuania	58	<b>A</b>
Italy	58	<b>A</b>
Slovak Republic	54	<b>A</b>
Australia	54	<b>A</b>
Israel	54	<b>A</b>
Malaysia	54	<b>A</b>
Russian Federation	52	<b>A</b>
Serbia and Montenegro	50	0
Norway	49	0
United States	49	0
International average	47	
Bulgaria	<b>47</b> 47	0
	47 46	0
Bulgaria	47	0
Bulgaria Moldova, Republic of	47 46 46 45	0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan	47 46 46 45 44	0 0 0
Bulgaria Moldova, Republic of Romania Scotland	47 46 46 45	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus	47 46 46 45 44	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of	47 46 46 45 44 40 39 37	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth.	47 46 46 45 44 40 39 37 34	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain	47 46 46 45 44 40 39 37 34 34	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth.	47 46 46 45 44 40 39 37 34 34	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon	47 46 46 45 44 40 39 37 34 34 32 31	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia	47 46 46 45 44 40 39 37 34 34 32 31	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia	47 46 46 45 44 40 39 37 34 32 31 29 29	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of	47 46 46 45 44 40 39 37 34 32 31 29 29 28	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana Saudi Arabia	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana Saudi Arabia South Africa	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28 25 23 18	0 0 0 0 V
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana Saudi Arabia	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28 25 23 18	0 0 0 0 V

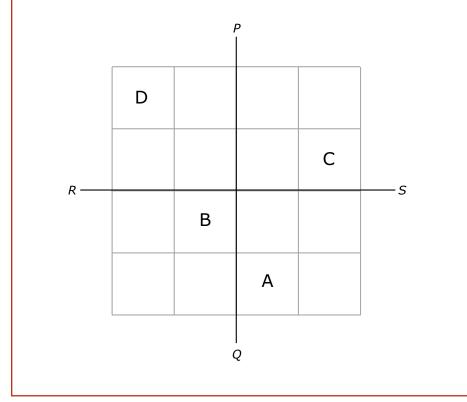
Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Symmetry and Transformations	Reasoning

### Geometry tiling: produce a pattern using letters



Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



Item Number: M032745

#### **SCORING**

#### **Correct Response**

 All cells are correct with symmetrical geometric pattern about both axes, PQ and RS (letters or drawings).

#### **Partial Response**

· With respect to at least one of the original tiles the other three tiles are correct.

#### **Incorrect Response**

- Letters placed symmetrically with respect to both PQ and RS.
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Lithuania	16	<b>A</b>
Japan	14	
Korea, Republic of	12	
Singapore	11	
Hong Kong, SAR	10	
Scotland	9	
England	9	<u> </u>
Chinese Taipei	9	
Netherlands	8	_
Slovenia	8	<u> </u>
Estonia	7	_ _
Australia	7	0
New Zealand	7	0
Belgium (Flemish)	7	<u> </u>
United States	6	0
Morocco	5	0
Russian Federation	5	0
Malaysia	5	0
International average	4	
Hungary	4	0
Slovak Republic	3	0
Latvia	3	0
Norway	3	0
Moldova, Republic of	3	0
Sweden	3	0
Indonesia	2	▼
Romania	2	•
Israel	2	<b>*</b>
Bulgaria	2	
Italy	1	Ť
Armenia	1	Ť
Lebanon	1	Ť
Macedonia, Republic of	1	Ť
South Africa	1	Ť
Egypt	1	Ť
Chile	1	Ť
Philippines	1	Ť
Iran, Islamic Republic of	1	* * * * * * * * * * * * * * * * * * *
Botswana	1	_
Jordan	1	<b>*</b>
Bahrain	1	<b>*</b>
Cyprus	0	_
Serbia and Montenegro	0	_
Tunisia	0	_
Palestinian Nat'l Auth.	0	<u>*</u>
i alestinian Nat i Autii.	U	•

## Country average vs. International average:

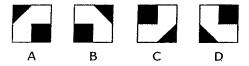
Higher
Not different
Lower

### Geometry tiling: produce a pattern using letters (continued)

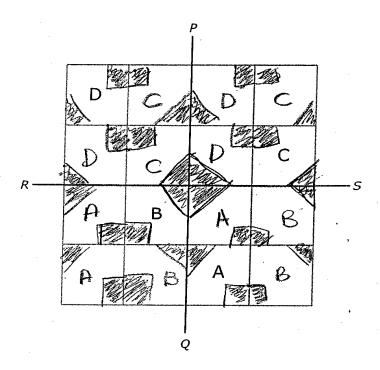
Item Number: M032745

### **Student Responses**

### **Correct Response:**



Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



### Geometry tiling: produce a pattern using letters (continued)

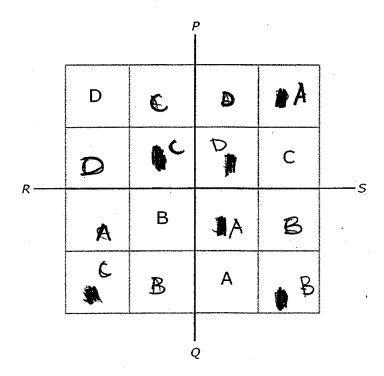
Item Number: M032745

### **Student Responses** (Continued)

### **Partial Response:**



Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



### Geometry tiling: produce a pattern using letters (continued)

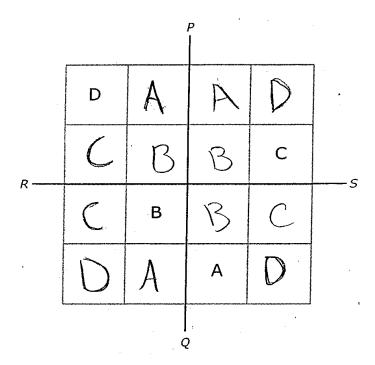
Item Number: M032745

### **Student Responses** (Continued)

### **Incorrect Response:**



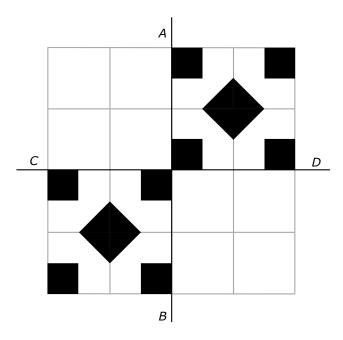
Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Symmetry and Transformations	Using Concepts

### Geometry tiling: makes a symmetrical pattern

There are several ways of arranging the tiles so that they form patterns. The grid below has been shaded to show how tiles can be placed on some of the squares. The pattern can be continued so that AB and CD are lines of symmetry.



Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

Item Number: M032743

#### **SCORING**

#### **Correct Response**

 Both quadrants correctly shaded (pattern shaded or demarcated in some way making symmetrical pattern about both axes, AB and CD).

#### **Incorrect Response**

- One of the two quadrants correctly shaded.
- · Incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Scotland Netherlands	85 82	<b>A</b>
Korea, Republic of	82	
New Zealand	80	
England	80	
Singapore	77	
Australia	76	
Hong Kong, SAR	75	
Hungary	69	
Japan	68	
Chinese Taipei	68	
United States	67	
Belgium (Flemish)	65	
Lithuania	63	
Slovenia	60	
Latvia	60	
Jordan	59	
Malaysia	56	
Slovak Republic	54	0
Russian Federation	53	0
Cyprus	51	0
Estonia	50	0
Italy	50	0
International average	49	
Bulgaria	48	0

international average		
Bulgaria	48	0
Norway	46	0
Sweden	46	0
Romania	44	0
Bahrain	43	$\blacksquare$
Israel	42	$\blacksquare$
Serbia and Montenegro	41	▼ ▼ ▼
Palestinian Nat'l Auth.	41	$\blacksquare$
Indonesia	39	▼
Morocco	38	$\blacksquare$
Iran, Islamic Republic of	34	<b>* * * *</b>
Saudi Arabia	34	$\blacksquare$
Philippines	34	$\blacksquare$
Egypt	31	<u>*</u>
Tunisia	25	$\blacksquare$
Macedonia, Republic of	25	* * * * * * * * * * * * * * * * * * *
Botswana	20	$\blacksquare$
Lebanon	18	$\blacksquare$
South Africa	17	$\blacksquare$
Armenia	13	$\blacksquare$
Chile	13	$\blacksquare$
Moldova, Republic of	1	$\blacksquare$

Country average vs. International average:

Higher Not different Cower

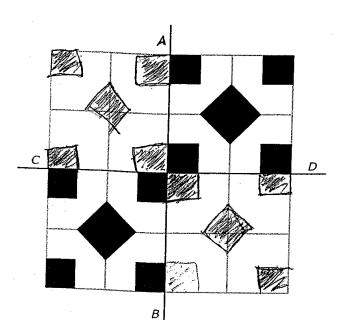
### Geometry tiling: makes a symmetrical pattern (continued)

Item Number: M032743

### **Student Responses**

#### **Correct Response:**

There are several ways of arranging the tiles so that they form patterns. The grid below has been shaded to show how tiles can be placed on some of the squares. The pattern can be continued so that AB and CD are lines of symmetry.



Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

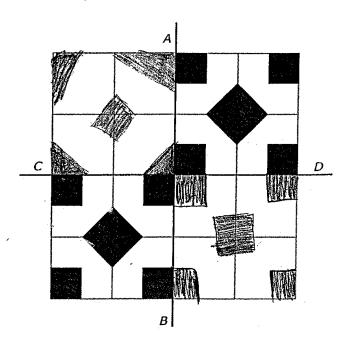
### Geometry tiling: makes a symmetrical pattern (continued)

Item Number: M032743

### Student Responses (continued)

#### **Incorrect Response:**

There are several ways of arranging the tiles so that they form patterns. The grid below has been shaded to show how tiles can be placed on some of the squares. The pattern can be continued so that AB and CD are lines of symmetry.

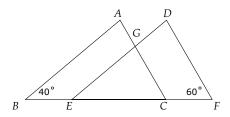


Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three- Dimensional Shapes	Solving Routine Problems

### Angle in overlapping congruent triangles

In this figure, triangles ABC and DEF are congruent with BC = EF.



What is the measure of angle *EGC*?

- (A) 20°
- (B) 40°
- © 60°
- (D) 80°
- € 100°

Item Number: M012026

**Correct Response:** 

 $\Box$ 

### **Overall Percent Correct**

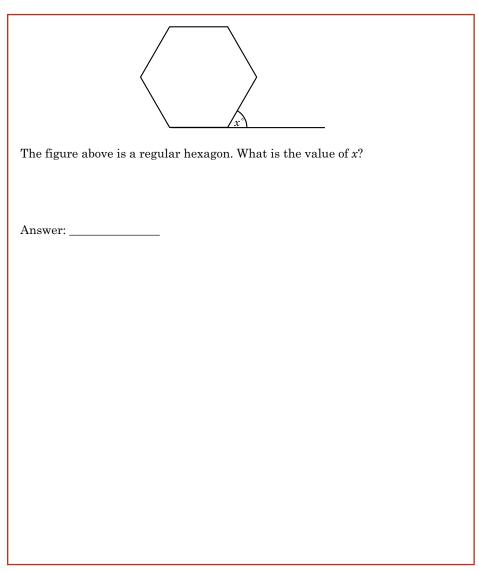
Korea, Republic of	84	<b>A</b>
Hong Kong, SAR	81	
Japan	80	
Singapore	79	
Chinese Taipei	73	
Estonia	67	
Belgium (Flemish)	66	
Latvia	63	
Bulgaria	60	
Israel	57	
Russian Federation	55	
Lebanon	55	
Scotland	54	
Slovak Republic	54	
Lithuania	51	
Hungary	50	0
Australia	47	0
England	47	O
Egypt	47	O
Malaysia	47	O
International average	45	

International average	45	
Armenia	45	0
Moldova, Republic of	45	0
Cyprus	44	0
Netherlands	44	0
Serbia and Montenegro	43	Ο
New Zealand	42	0
Jordan	42	Ο
Italy	42	0
Tunisia	41	▼
Bahrain	41	▼
Sweden	40	$\blacksquare$
Palestinian Nat'l Auth.	39	▼
Iran, Islamic Republic of	37	▼
Slovenia	37	$\blacksquare$
United States	36	$\blacksquare$
Macedonia, Republic of	33	•
Norway	32	▼
Indonesia	31	$\blacksquare$
Morocco	31	▼
Chile	30	•
Saudi Arabia	26	$\blacksquare$
South Africa	21	$\blacksquare$
Ghana	20	▼
Botswana	20	O V
Romania	18	▼
Philippines	15	▼

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three- Dimensional Shapes	Solving Routine Problems

### The angle by a regular hexagon



#### Item Number: M032693

#### **SCORING**

#### **Correct Response**

• 60 degrees

#### **Incorrect Response**

- 120 degrees
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Japan	73	
Chinese Taipei	70	
Korea, Republic of	68	
Hong Kong, SAR	64	
Singapore	62	
Hungary	59	
Slovenia	52	
Norway	50	
Serbia and Montenegro	46	
Romania	45	
Belgium (Flemish)	45	
Slovak Republic	43	<u> </u>
Armenia	42	<u> </u>
Russian Federation	42	<u> </u>
Netherlands	40	<u> </u>
Macedonia, Republic of	39	<u> </u>
Moldova, Republic of	39	<u> </u>
Estonia	37	0
Latvia	33	0
Malaysia	33	0
International average	33	
	32	0
Italy	32 32	0
Bulgaria		
Lithuania	2.1	$\circ$
Lithuania	31	0
England	30	Ο
England Tunisia	30 29	O ▼
England Tunisia Lebanon	30 29 28	<ul><li>○</li><li>▼</li></ul>
England Tunisia Lebanon New Zealand	30 29 28 27	<ul><li>○</li><li>▼</li><li>▼</li></ul>
England Tunisia Lebanon New Zealand Australia	30 29 28 27 27	<ul><li>○</li><li>▼</li><li>▼</li></ul>
England Tunisia Lebanon New Zealand Australia Israel	30 29 28 27 27 26	<ul><li>○</li><li>▼</li><li>▼</li></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden	30 29 28 27 27 26 24	<ul><li>○</li><li>▼</li><li>▼</li></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of	30 29 28 27 27 26 24 24	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan	30 29 28 27 27 26 24 24 23	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth.	30 29 28 27 27 26 24 24 23 23	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt	30 29 28 27 27 26 24 24 23 23 23	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland	30 29 28 27 27 26 24 24 23 23 23 23	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain	30 29 28 27 27 26 24 24 23 23 23 23 23 22	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia	30 29 28 27 27 26 24 24 23 23 23 23 22 21	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20	O V
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20	O V
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19	· · · · · · · · · · · · · · · · · · ·
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17	· · · · · · · · · · · · · · · · · · ·
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16	· · · · · · · · · · · · · · · · · · ·
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana Chile	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16 14 9	· · · · · · · · · · · · · · · · · · ·
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana Chile Morocco	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16 14 9	· · · · · · · · · · · · · · · · · · ·
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana Chile Morocco Philippines	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16 14 9 9	O V
England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana Chile Morocco	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16 14 9	· · · · · · · · · · · · · · · · · · ·

## Country average vs. International average:

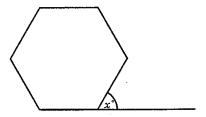
Higher
Not different
Lower

### The angle by a regular hexagon (continued)

Item Number: M032693

## **Student Responses**

### **Correct Response:**

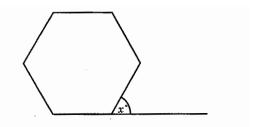


The figure above is a regular hexagon. What is the value of x?

(000

Answer: \_\_\_\_\_\_\_\_

### **Incorrect Response:**

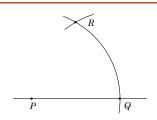


The figure above is a regular hexagon. What is the value of x?

55°

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three- Dimensional Shapes	Using Concepts

### The size of angle PRQ



In the figure above, an arc of a circle with center P has been drawn to cut the line at Q. Then an arc with the same radius and center Q was drawn to cut the first arc at R. What would be the size of angle PRQ?

- A 30°
- B 45°
- © 60°
- D 75°

Item Number: M032689

**Correct Response:** 

0

### **Overall Percent Correct**

Korea, Republic of	70	
Chinese Taipei	70	
Hungary	69	
Tunisia	66	
Japan	64	
Malaysia	62	
Hong Kong, SAR	59	
Norway	58	
Slovak Republic	58	
Lebanon	58	
Serbia and Montenegro	58	
Estonia	56	
Belgium (Flemish)	54	
Slovenia	52	
Russian Federation	51	0
Romania	51	0
Macedonia, Republic of	50	0
Singapore	49	
Bulgaria	48	0
Latvia	46	0
International average	46	
New Zealand	45	0
	45 44	0
New Zealand Moldova, Republic of Netherlands	44	_
Moldova, Republic of	44 44	0
Moldova, Republic of Netherlands Saudi Arabia	44 44 43	0 0
Moldova, Republic of Netherlands	44 44	0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth.	44 44 43 43	0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England	44 44 43 43 42	0 0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth.	44 44 43 43 42 42	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy	44 44 43 43 42 42 41	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan	44 44 43 43 42 42 41 40 39	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana	44 44 43 43 42 42 41 40 39 38	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan	44 44 43 43 42 42 41 40 39	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt	44 44 43 43 42 42 41 40 39 38 38	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia	44 44 43 42 42 41 40 39 38 38 37 37	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia	44 44 43 42 42 41 40 39 38 38 37 37 36	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of	44 44 43 42 42 41 40 39 38 38 37 37 36 36	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland	44 44 43 42 42 41 40 39 38 37 37 36 36 35	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden	44 44 43 42 42 41 40 39 38 37 37 36 36 35 35	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain	44 44 43 42 42 41 40 39 38 38 37 36 36 35 35	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain Israel	44 44 43 42 42 41 40 39 38 38 37 37 36 36 35 35 35	0 0 0 0 0
Moldova, Republic of Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain	44 44 43 42 42 41 40 39 38 38 37 36 36 35 35	0 0 0 0 0

Country average vs. International average:

34 32

29

25

Cyprus

Indonesia

South Africa

Philippines

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

### 250 ml bottles filled by 400 liters

The number of 250 milliliter bottles that can be filled from 400 liters of water is  $\,$ 

A 16

(B) 160

© 1,600

D 16,000

Item Number: M022005

**Correct Response:** 

C

### **Overall Percent Correct**

Singapore	68	
Netherlands	59	
Belgium (Flemish)	55	
Sweden	54	
Malaysia	53	
Latvia	51	
Estonia	50	
Australia	49	<b>A</b>
Lithuania	49	
Romania	48	
Hungary	48	
Hong Kong, SAR	47	<u> </u>
Russian Federation	46	<u> </u>
Slovak Republic	44	<u> </u>
Japan	44	<u> </u>
Moldova, Republic of	43	0
Italy	42	0
Norway	42	0
England	42	0
Armenia	42	0
New Zealand	41	0
Slovenia	41	0
	41	0
Korea, Republic of Chinese Taipei	41	0
	41	
Cyprus	• • •	0
Scotland	40	0
Bulgaria	39	0
International average	39	
Serbia and Montenegro	38	0
Israel	38	0
United States	33	•
Philippines	32	•
Indonesia	32	•
South Africa	31	•
Palestinian Nat'l Auth.	30	•
Lebanon	30	•
Chile	29	* * * * * * * * * * * * * * * * * * *
Jordan	29	$\blacksquare$
Macedonia, Republic of	29	$\blacksquare$
Egypt	29	$\blacksquare$
Iran, Islamic Republic of	28	$\blacksquare$
Tunisia	27	$\blacksquare$
Bahrain	27	$\blacksquare$
Botswana	25	$\blacksquare$
Saudi Arabia	25	$\blacksquare$
Morocco	22	▼
Ghana	20	▼

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

### Which is least amount of time

Which of these is the LEAST amount of time?

- A 1 day
- (B) 20 hours
- © 1,800 minutes
- $\bigcirc$  90,000 seconds

Item Number: M022188

**Correct Response:** 

В

### **Overall Percent Correct**

Chinese Taipei 66 Korea, Republic of 63 Hungary 63 Singapore 60 Belgium (Flemish) 59 Japan 54 Hong Kong, SAR 54	<b>&gt; &gt; &gt; &gt; &gt; &gt; &gt;</b>
Slovenia 54	<b>A</b>
Slovak Republic 52 Netherlands 52	<b>A</b>
Latvia 51	<b>A</b>
Armenia 50	
Serbia and Montenegro 49	
Estonia 48	<b>A</b>
Macedonia, Republic of 48	<b>A</b>
Russian Federation 47	<b>A</b>
United States 47	<b>A</b>
Malaysia 47	0
Moldova, Republic of 45	0
Italy 45 Bulgaria 44	0
Sweden 44	0
International average 43	þ
Romania 43	0
Lithuania 42	0
Israel 41	0
Tunisia 41	0
Australia 41	0
Lebanon 40	0
Cyprus 39	▼
England 39	0
Norway 39	_
Jordan 38	
Scotland 38 Palestinian Nat'l Auth. 37	
New Zealand 36	¥
Egypt 36	* * * * * * * * * * * * * * * * * * *
Chile 35	▼
Saudi Arabia 35	▼
Philippines 35	▼
Iran, Islamic Republic of 35	▼
South Africa 32	▼
Bahrain 32	▼
Morocco 32	<b>V</b>
Ghana 27	▼
Indonesia 26	_
Botswana 26	, i

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

### The unit used for a soccer field

Which of these units would usually be used for an area the size of a soccer field?

- (A) square centimeters
- (B) cubic centimeters
- © square meters
- (D) cubic meters

Item Number: M032699

**Correct Response:** 

0

### **Overall Percent Correct**

Estonia	90	<b>A</b>
Sweden	89	<b>A</b>
New Zealand	89	<b>A</b>
Italy	88	<b>A</b>
Singapore	88	<b>A</b>
Hungary	88	<b>A</b>
Australia	87	<b>A</b>
Slovak Republic	87	<b>A</b>
Chile	87	<b>A</b>
Belgium (Flemish)	86	<b>A</b>
Netherlands	86	<b>A</b>
Latvia	86	<b>A</b>
Romania	86	
Lithuania	84	
Serbia and Montenegro	84	<b>A</b>
Bulgaria	84	
Russian Federation	83	
Hong Kong, SAR	82	<b>A</b>
Chinese Taipei	82	<b>A</b>
Japan	82	<b>A</b>
England	82	<b>A</b>
Moldova, Republic of	82	<b>A</b>
Scotland	81	
Norway	80	<b>A</b>
		_
Malaysia	77	0
Malaysia United States	77 76	0
United States Macedonia, Republic of		
United States Macedonia, Republic of International average	76 76 <b>75</b>	0
United States Macedonia, Republic of International average Korea, Republic of	76 76 <b>75</b> 74	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia	76 76 <b>75</b> 74 74	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel	76 76 <b>75</b> 74 74 73	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia	76 76 <b>75</b> 74 74 73 71	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus	76 76 <b>75</b> 74 74 73	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia	76 76 75 74 74 73 71 69 68	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia	76 76 75 74 74 73 71 69 68 66	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia	76 76 75 74 74 73 71 69 68	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia	76 76 75 74 74 73 71 69 68 66 66 66	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan	76 76 75 74 74 73 71 69 68 66 66 64 64	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco	76 76 75 74 74 73 71 69 68 66 66 64 64 64	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana	76 76 75 74 74 73 71 69 68 66 66 64 64	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines	76 76 75 74 74 73 71 69 68 66 66 64 64 64	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana	76 76 75 74 74 73 71 69 68 66 64 64 62 61 60 58	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines	76 76 75 74 74 73 71 69 68 66 66 64 62 61 60 58 56	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia	76 76 75 74 74 73 71 69 68 66 64 64 62 61 60 58	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon	76 76 75 74 74 73 71 69 68 66 66 64 62 61 60 58 56	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia Iran, Islamic Republic of South Africa	76 76 77 74 74 73 71 69 68 66 64 64 62 61 60 58 56 55 52	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia Iran, Islamic Republic of	76 76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56 55	0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

### Measure of the area of a triangle

Which of these could be the measure of the area of a triangle?

- A 2 cm
- B 3 m
- $\bigcirc$  5 cm<sup>2</sup>
- $\bigcirc$  8 m<sup>3</sup>

Item Number: M032732

**Correct Response:** 

0

### **Overall Percent Correct**

Japan	84	
Singapore	81	<u> </u>
Estonia	78	<u> </u>
Chinese Taipei	76	
Belgium (Flemish)	75	
Russian Federation	75	
Hong Kong, SAR	73	
Slovenia Slovenia	71	
Sweden	70	
Netherlands	70	
Lithuania	70	
Korea, Republic of	69	
Hungary	68	
Slovak Republic	67	
Serbia and Montenegro	67	
Italy	67	
Malaysia	64	
Romania	62	
Latvia	61	
New Zealand	57	0
Moldova, Republic of	56	0
International average	55	þ
Lebanon	55	0
Norway	54	0
Bulgaria	52	0
Macedonia, Republic of	52	0
Macedonia, Republic of Australia	52 52	0
Macedonia, Republic of Australia Cyprus	52 52 52	0 0
Macedonia, Republic of Australia Cyprus England	52 52 52 51	0 0 0
Macedonia, Republic of Australia Cyprus England Scotland	52 52 52 51 48	0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana	52 52 52 51 48 48	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States	52 52 52 51 48 48 47	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt	52 52 52 51 48 48 47 46	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan	52 52 52 51 48 48 47	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia	52 52 52 51 48 48 47 46 45	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia	52 52 52 51 48 48 47 46 45	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia	52 52 52 51 48 48 47 46 45 44 44	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel	52 52 52 51 48 48 47 46 45 44	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia	52 52 52 51 48 48 47 46 45 44 44 43 43	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth.	52 52 52 51 48 48 47 46 45 44 44 43 43 43	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain	52 52 52 51 48 48 47 46 45 44 44 43 43 42 37	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana South Africa	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34 34	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana South Africa Saudi Arabia	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34 34 32	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana South Africa Saudi Arabia Morocco	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34 34 32 30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Knowing Facts and Procedures

### Actual length of box from rounded measure

The length of a box is  $9~\mathrm{cm}$  to the nearest centimeter. Which of these could be the actual length of the box?

- (A) 10 cm
- (B) 9.9 cm
- © 9.6 cm
- (D) 8.6 cm

Item Number: M012003

Correct Response:

D

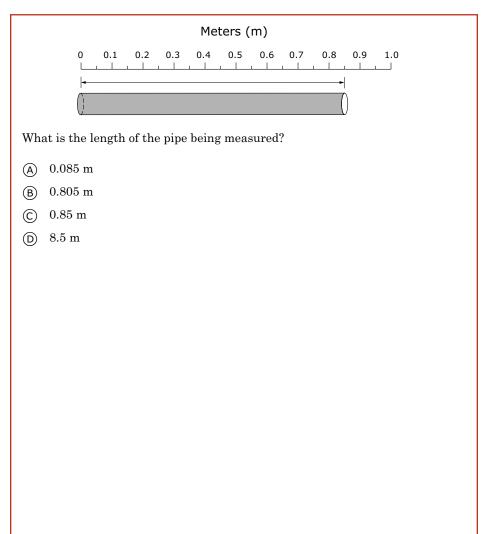
### **Overall Percent Correct**

Korea, Republic of	90	
Hungary	89	<b>A</b>
Netherlands	88	
Hong Kong, SAR	87	<b>A</b>
Singapore	87	
Belgium (Flemish)	82	
Slovak Republic	81	
Chinese Taipei	80	
Sweden	80	
Scotland	76	
England	75	
Australia	73	
Russian Federation	73	
Latvia	70	
Estonia	67	
United States	67	
New Zealand	65	<b>A</b>
Israel	64	
Japan	64	
Malaysia	62	
Norway	61	
Romania	58	
Serbia and Montenegro	55	
Slovenia	53	0
and the second s	52	0
Italy		U
International average	50	
International average Armenia	<b>50</b> 45	<b>V</b>
International average Armenia Macedonia, Republic of	<b>50</b> 45 42	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of	50 45 42 42	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan	50 45 42 42 39	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile	50 45 42 42 39 38	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus	50 45 42 42 39 38 37	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain	50 45 42 42 39 38 37 33	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth.	50 45 42 42 39 38 37 33 33	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt	50 45 42 42 39 38 37 33 33 30	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia	50 45 42 42 39 38 37 33 33 30 30	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria	50 45 42 42 39 38 37 33 33 30 30 28	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon	50 45 42 42 39 38 37 33 33 30 30 28 23	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines	50 45 42 42 39 38 37 33 33 30 30 28 23 23	<b>V</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania	50 45 42 42 39 38 37 33 30 30 28 23 23 21	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana	50 45 42 42 39 38 37 33 30 30 28 23 23 21 20	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of	50 45 42 42 39 38 37 33 30 30 28 23 21 20 15	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia	50 45 42 42 39 38 37 33 30 30 28 23 23 21 20 15 13	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia South Africa	50 45 42 42 39 38 37 33 30 30 28 23 23 21 20 15 13	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia South Africa Ghana	50 45 42 42 39 38 37 33 30 28 23 23 21 20 15 13 8	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia South Africa Ghana Morocco	50 45 42 42 39 38 37 33 30 28 23 23 21 20 15 13 8 8	<b>▼</b>
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia South Africa Ghana	50 45 42 42 39 38 37 33 30 28 23 23 21 20 15 13 8	<b>▼</b>

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Knowing Facts and Procedures

### Length of pipe from meter scale



Item Number: M012038

**Correct Response:** 

0

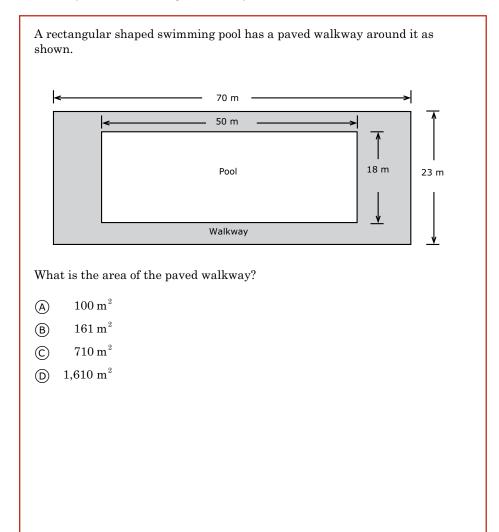
### **Overall Percent Correct**

Singapore	95	<b>A</b>
Hong Kong, SAR	94	<b>A</b>
Japan	93	<b>A</b>
Estonia	91	<b>A</b>
Chinese Taipei	90	<b>A</b>
Korea, Republic of	89	<b>A</b>
Netherlands	89	<b>A</b>
Belgium (Flemish)	87	<b>A</b>
Hungary	86	<b>A</b>
Malaysia	86	<b>A</b>
Sweden	86	<b>A</b>
Latvia	83	<b>A</b>
Russian Federation	82	<b>A</b>
Lithuania	81	<b>A</b>
Scotland	81	<b>A</b>
England	80	<b>A</b>
New Zealand	79	<b>A</b>
Slovak Republic	79	<b>A</b>
Slovenia	79	<b>A</b>
Australia	78	<b>A</b>
Italy	74	<b>A</b>
Norway	74	<b>A</b>
United States	73	<b>A</b>
Bulgaria	72	<b>A</b>
Israel	72	<b>A</b>
Serbia and Montenegro	72 72	<b>A</b>
Serbia and Montenegro Macedonia, Republic of	72 70	
Serbia and Montenegro Macedonia, Republic of International average	72 70 <b>67</b>	0
Serbia and Montenegro Macedonia, Republic of International average Lebanon	72 70 <b>67</b> 64	0
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of	72 70 <b>67</b> 64 64	0 0
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania	72 70 <b>67</b> 64 64 64	0 0 0
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana	72 70 <b>67</b> 64 64 64 64	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus	72 70 <b>67</b> 64 64 64 61 61	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile	72 70 <b>67</b> 64 64 64 61 61 58	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia	72 70 <b>67</b> 64 64 64 61 61 58	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia	72 70 <b>67</b> 64 64 64 61 61 58 54	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco	72 70 <b>67</b> 64 64 64 61 61 58 54 54	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia	72 70 <b>67</b> 64 64 64 61 61 58 54 54 50 49	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of	72 70 <b>67</b> 64 64 61 61 58 54 54 50 49	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines	72 70 <b>67</b> 64 64 64 61 61 58 54 54 50 49 48 42	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa	72 70 <b>67</b> 64 64 61 61 58 54 54 50 49 48 42 40	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana	72 70 <b>67</b> 64 64 61 61 58 54 50 49 48 42 40 39	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan	72 70 64 64 64 61 61 58 54 54 50 49 48 42 40 39 38	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth.	72 70 64 64 64 61 61 58 54 50 49 48 42 40 39 38 34	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth. Bahrain	72 70 64 64 64 61 61 58 54 50 49 48 42 40 39 38 34 32	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth. Bahrain Egypt	72 70 64 64 64 61 61 58 54 50 49 48 42 40 39 38 34 32 31	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Macedonia, Republic of International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth. Bahrain	72 70 64 64 64 61 61 58 54 50 49 48 42 40 39 38 34 32	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Knowing Facts and Procedures

### Area of paved walkway around pool



Item Number: M022021

Correct Response:

**Overall Percent Correct** 

Singapore Hong Kong, SAR Korea, Republic of Chinese Taipei Japan Malaysia Netherlands Estonia Belgium (Flemish) Slovak Republic Sweden Australia Italy New Zealand Lithuania Hungary England Slovenia United States Cyprus Scotland International average	86 82 77 76 60 57 53 51 50 48 46 45 44 43 40 40 40 39 39	
Serbia and Montenegro Latvia Bulgaria	38 38 38	0 0 0
Russian Federation	38	0
Israel	37	0
Israel Egypt Moldova, Republic of Norway	37 33 33 32	<ul><li>○</li><li>▼</li><li>▼</li></ul>
Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of	33 33 32 30 28	* * * * * *
Egypt Moldova, Republic of Norway Romania	33 33 32 30	* * * * * * * * * * * * * * * * * * *
Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth.	33 33 32 30 28 28 26 25 23 22	* * * * * * * * * * * * * * * * * * *
Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain	33 33 32 30 28 28 26 25 23	* * * * * * * * * * * * * * * * * * *
Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia Morocco	33 33 32 30 28 28 26 25 23 22 20 19 19 18 18	* * * * * * * * * * * * * * * * * * *
Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia	33 33 32 30 28 28 26 25 23 22 20 19 19	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Reasoning

### Oranges are packed in boxes

Oranges are packed in boxes. The average diameter of the oranges is  $6~\rm cm$ , and the boxes are  $60~\rm cm$  long,  $36~\rm cm$  wide, and  $24~\rm cm$  deep.

Which of these is the BEST approximation of the number of oranges that can be packed in a box?

(A) 30

(B) 240

(c) 360

D 1,920

Item Number: M032647

**Correct Response:** 

В

### **Overall Percent Correct**

Japan	62	<b>A</b>
Netherlands	61	
Sweden	57	
Singapore	57	
Belgium (Flemish)	56	
Australia	56	
England	55	
Korea, Republic of	55	
Chinese Taipei	55	
Hungary	55	
Latvia	54	
Scotland	53	
Russian Federation	53	
Estonia	53	
Hong Kong, SAR	51	
Slovenia	51	
Slovak Republic	51	
New Zealand	51	<b>A</b>
Lithuania	50	
United States	50	<b>A</b>
Norway	48	
Bulgaria	46	0
Italy	45	0
International average	44	
Serbia and Montenegro	43	0
Cyprus	42	0
Moldova, Republic of	42	0
Macedonia, Republic of	41	Ο
Chile	40	▼
Israel	39	•
Botswana	37	•
Malaysia	37	•
Romania	36	•
Morocco	35	* * * * * * * * * * * * * * * * * * *
Philippines	35	▼

Country average vs. International average:

Lebanon

Bahrain

Egypt

Tunisia

Indonesia

Armenia

Jordan

Ghana

South Africa

Saudi Arabia

Iran, Islamic Republic of

Palestinian Nat'l Auth.

34

32

32

31

31

31

31

31

29 29

28

28

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Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

### Length of rectangle from width/perimeter

A thin wire 20 centimeters long is formed into a rectangle. If the width of this rectangle is 4 centimeters, what is its length?

- (A) 5 centimeters
- (B) 6 centimeters
- (C) 12 centimeters
- (D) 16 centimeters

Item Number: M012030

**Correct Response:** 

В

### Overall Percent Correct

Singapore	81	
Japan	65	_
Chinese Taipei	62	<b>A</b>
Hong Kong, SAR	62	<b>A</b>
Korea, Republic of	62	<b>A</b>
Netherlands	56	$\blacktriangle$
Belgium (Flemish)	56	<b>A</b>
Sweden	54	<b>A</b>
Estonia	53	<b>A</b>
Latvia	52	<b>A</b>
Australia	50	<b>A</b>
Russian Federation	47	<b>A</b>
England	46	<b>A</b>
Slovak Republic	45	$\blacktriangle$
Serbia and Montenegro	45	<b>A</b>
New Zealand	45	<b>A</b>
Israel	44	<b>A</b>
Bulgaria	43	<b>A</b>
Romania	43	<b>A</b>
Italy	42	<b>A</b>
Malaysia	41	0
Norway	40	0
Moldova, Republic of	39	0
United States	39	0
Lithuania	38	0
International average	37	
International average Scotland	<b>37</b> 37	0
International average Scotland Hungary	<b>37</b> 37 37	0
International average Scotland Hungary Cyprus	37 37 37 36	0 0
International average Scotland Hungary Cyprus Slovenia	37 37 37 36 33	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia	37 37 37 36 33 31	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of	37 37 37 36 33 31 28	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of	37 37 36 33 31 28 27	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile	37 37 36 33 31 28 27 27	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia	37 37 36 33 31 28 27 27	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon	37 37 36 33 31 28 27 27 26 23	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan	37 37 36 33 31 28 27 27 26 23 22	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth.	37 37 36 33 31 28 27 27 26 23 22 19	0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt	37 37 36 33 31 28 27 27 26 23 22 19	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain	37 37 36 33 31 28 27 27 26 23 22 19 18	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana	37 37 36 33 31 28 27 27 26 23 22 19 18 18	0 0 0 V V V V V V V V V V V V V V V V V
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa	37 37 36 33 31 28 27 27 26 23 22 19 18 18 17	0 0 0 V V V V V V V V V V V V V V V V V
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia	37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16	0 0 0 V V V V V V V V V V V V V V V V V
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco	37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14	0 0 0 V V V V V V V V V V V V V V V V V
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco Philippines	37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14 14	0 0 0 V V V V V V V V V V V V V V V V V
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco Philippines Indonesia	37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14 14 14	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco Philippines	37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14 14	0 0 0 V V V V V V V V V V V V V V V V V

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

### Time when finish homework

Kris begins her homework at 6:40. If it takes Kris three-quarters of an hour to do her homework, at what time will she finish?
Answer:

Item Number: M022148

#### **SCORING**

#### **Correct Response**

- 7:25
- Other response equivalent to 7:25.

#### **Incorrect Response**

- 7:20
- 7:30
- 6:25
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Netherlands	91	<b>A</b>
Belgium (Flemish)	85	<b>A</b>
Hungary	84	<b>A</b>
England	80	<b>A</b>
Sweden	78	
Singapore	78	<b>A</b>
Scotland	76	<b>A</b>
Australia	72	<b>A</b>
Norway	71	<b>A</b>
New Zealand	68	<b>A</b>
Hong Kong, SAR	67	<b>A</b>
Slovenia	67	<b>A</b>
Italy	65	<b>A</b>
Romania	63	<b>A</b>
Japan	63	<b>A</b>
Israel	63	<b>A</b>
Slovak Republic	59	<b>A</b>
Chinese Taipei	59	<b>A</b>
Estonia	58	<b>A</b>
Cyprus	58	<b>A</b>
Korea, Republic of	57	<b>A</b>
United States	55	<b>A</b>
Malaysia	51	lack
Latvia	46	0
International average	45	
International average Lebanon	45	0
International average Lebanon Moldova, Republic of	45 42	0
International average Lebanon Moldova, Republic of Russian Federation	45 42 41	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro	45 42 41 36	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria	45 42 41 36 36	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia	45 42 41 36 36 35	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania	45 42 41 36 36 35 34	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile	45 42 41 36 36 35 34 29	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia	45 42 41 36 36 35 34 29	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt	45 42 41 36 36 35 34 29 20	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan	45 42 41 36 36 35 34 29 20 20	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of	45 42 41 36 35 34 29 20 20	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia	45 42 41 36 35 34 29 20 20 19 18	0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth.	45 42 41 36 35 34 29 20 20 19 18 18	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco	45 42 41 36 35 34 29 20 19 18 18 16	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of	45 42 41 36 36 35 34 29 20 20 19 18 18 16 15	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain	45 42 41 36 35 34 29 20 20 19 18 18 16 15 15	0 0 0 V V V V V V V V V V V V V V V V V
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana	45 42 41 36 35 34 29 20 19 18 18 16 15 14	0 0 0 V V V V V V V V V V V V V V V V V
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia	45 42 41 36 35 34 29 20 19 18 16 15 15 14 11 9	0 0 0 V V V V V V V V V V V V V V V V V
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia South Africa	45 42 41 36 36 35 34 29 20 19 18 16 15 15 14 11 9 8	0 0 0 V V V V V V V V V V V V V V V V V
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia South Africa Philippines	45 42 41 36 36 35 34 29 20 19 18 16 15 15 14 11 9 8	0 0 0
International average Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia South Africa	45 42 41 36 36 35 34 29 20 19 18 16 15 15 14 11 9 8	0 0 0 V V V V V V V V V V V V V V V V V

## Country average vs. International average:

Higher	
Not different	0
Lower	_

### Time when finish homework (continued)

Item Number: M022148

### **Student Responses**

### **Correct Response:**

Kris begins her homework at 6:40. If it takes Kris three-quarters of an hour to do her homework, at what time will she finish?

Answer: 7,25

### **Incorrect Response:**

Kris begins her homework at 6:40. If it takes Kris three-quarters of an hour to do her homework, at what time will she finish?

Answer: 7:20

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

### 5 squares: area of one square

The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>. A. Find the area of one square. Answer: \_\_\_\_\_ cm<sup>2</sup> B. Find the length of one side of one square. Answer: \_\_\_\_\_ cm C. Find the perimeter of the whole figure in centimeters. Answer: \_\_\_\_\_ cm

Item Number: M022227A

#### **SCORING**

#### **Correct Response**

• 49

#### **Incorrect Response**

• 1

• Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singaporo	89	<u> </u>
Singapore Hong Kong, SAR	89 88	<b>A</b>
J J.		<b>A</b>
Korea, Republic of	87 86	<b>A</b>
Japan	86	<b>A</b>
Armenia	84	<b>A</b>
Chinese Taipei	83	<b>A</b>
Estonia	69	<b>A</b>
Netherlands	69	<u> </u>
Russian Federation	68	<b>A</b>
Belgium (Flemish)	67	
Slovenia	66	
Scotland	63	
United States	60	
Malaysia	60	
Hungary	60	
Bulgaria	59	<b>A</b>
Romania	58	
Tunisia	57	
Moldova, Republic of	57	
Italy	57	
Slovak Republic	57	
Lithuania	57	
Australia	56	0
International average	51	
Lebanon	49	O
Sweden	48	0
England	47	0
Serbia and Montenegro	47	•
Israel	47	•
Egypt	46	
New Zealand	45	•
Jordan	45	•
Cyprus	43	•
Macedonia, Republic of	41	$\blacksquare$
Iran, Islamic Republic of	38	•
Bahrain	37	$\blacksquare$
Indonesia	33	•
Philippines	32	<b>*</b>
Norway	32	$\blacksquare$
Morocco	31	$\blacksquare$
Palestinian Nat'l Auth.	30	$\blacksquare$
Botswana	28	$\blacksquare$
Chile	24	<b>V</b>
Saudi Arabia	15	•
Ghana	13	
Gridina	10	•
South Africa		<b>▼</b>
	10	▼

# Country average vs. International average:

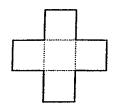
5 squares: area of one square (continued)

Item Number: M022227A

## **Student Responses**

### **Correct Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is  $\frac{1245 \text{ cm}^2}{1245 \text{ cm}^2}$ .



245

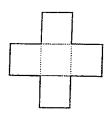
Find the area of one square.

Answer: \_\_\_\_\_ cm²

### **Incorrect Response:**

55. The figure consists of 5 squares of equal area. The area of the whole figure is  $\frac{7}{245}$  cm<sup>2</sup>





a. Find the area of one square.

Answer: \_\_\_\_\_ cm<sup>2</sup>

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

### 5 squares: length of one side

The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>. A. Find the area of one square. Answer: \_\_\_\_\_ cm<sup>2</sup> B. Find the length of one side of one square. Answer: \_\_\_\_\_ cm C. Find the perimeter of the whole figure in centimeters. Answer: cm

#### Item Number: M022227B

#### **SCORING**

#### **Correct Response**

- 7 (or 49)
- Correct square root of incorrect answer to part a.

#### **Incorrect Response**

- 1 only if the answer to part A is not 1.
- Indication of division of area of one square (as obtained in part a) by 4 (e.g., 12.25, 49/4, etc.).
- 24.5 or other indication of division by 2.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore	80	
Hong Kong, SAR	78	
Korea, Republic of	70	
Chinese Taipei	65	
Armenia	62	
Romania	45	
Russian Federation	43	
Italy	43	
Japan	42	
Estonia	39	<u> </u>
Netherlands	38	<u> </u>
Belgium (Flemish)	37	<u> </u>
Serbia and Montenegro	36	<u> </u>
Moldova, Republic of	35	
Hungary	35	
Malaysia	34	
Lithuania	33	
Litnuania Bulgaria	33 32	0
9		0
United States	29	
Slovak Republic	29	0
Slovenia	29	0
International average	28	
Scotland	27	0
Australia	26	O
England	23	0
Sweden	23	•
•	23 23	•
Sweden New Zealand Cyprus	23 23 21	•
Sweden New Zealand	23 23	•
Sweden New Zealand Cyprus	23 23 21	•
Sweden New Zealand Cyprus Israel	23 23 21 20	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of	23 23 21 20 20	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt	23 23 21 20 20 20	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon	23 23 21 20 20 20 18	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia	23 23 21 20 20 20 18	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan	23 23 21 20 20 20 18 17	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth.	23 23 21 20 20 20 18 17 16	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia	23 23 21 20 20 20 18 17 16 16	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain	23 23 21 20 20 20 18 17 16 16 15	$\blacksquare$
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of	23 23 21 20 20 20 18 17 16 16 15 14	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway	23 23 21 20 20 20 18 17 16 16 15 14 11	$\blacksquare$
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines	23 23 21 20 20 20 18 17 16 16 15 14 11 11	* * * * * * * * * * * * * * * * * * *
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9	* * * * * * * * * * * * * * * * * * *
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9	* * * * * * * * * * * * * * * * * * *
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8	* * * * * * * * * * * * * * * * * * *
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile Botswana	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8 8 6 4	* * * * * * * * * * * * * * * * * * *
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8 8	•
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile Botswana South Africa	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8 8 6 4 3	* * * * * * * * * * * * * * * * * * *

## Country average vs. International average:

Higher
Not different
Lower

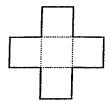
5 squares: length of one side (continued)

Item Number: M022227B

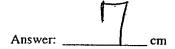
## **Student Responses**

### **Correct Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.

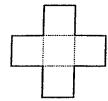


b. Find the length of one side of one square.



### **Incorrect Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.



b. Find the length of one side of one square.

Answer: \_\_\_\_\_16 cm

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

### 5 squares: perimeter whole figure

The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>. A. Find the area of one square. Answer: \_\_\_\_\_ cm<sup>2</sup> B. Find the length of one side of one square. Answer: \_\_\_\_\_ cm C. Find the perimeter of the whole figure in centimeters. Answer: cm

#### Item Number: M022227C

#### **SCORING**

#### **Correct Response**

- 84
- 12, on condition 1 was the response for part b.
- Other responses consistent with answer to part b, using multiplication by 12 (e.g., 147, 294, etc.).

#### **Incorrect Response**

- An answer that is 4 times the response to part b.
- Indication of multiplication by 12 but multiplication is incorrect.
- 245 [Confusion between area and perimeter].
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore	72	
Hong Kong, SAR	58	
Korea, Republic of	53	
Chinese Taipei	51	
Japan	47	
Armenia	42	
Malaysia	38	
Netherlands	38	
Australia	30	
Scotland	27	
England	27	<u> </u>
Estonia	26	<u> </u>
Belgium (Flemish)	25	<u> </u>
Hungary	24	<u> </u>
Slovenia	24	<u> </u>
Slovak Republic	24	
New Zealand	23	0
Russian Federation	23	0
United States	23	0
Italy	22	0
Lithuania	22	0
Sweden	21	0
	20	U
International average		_
Serbia and Montenegro	18	0
Serbia and Montenegro Latvia	18 17	0
Serbia and Montenegro Latvia Cyprus	18 17 17	0
Serbia and Montenegro Latvia Cyprus Norway	18 17 17 16	0 0
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of	18 17 17 16 16	0 0 0
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania	18 17 17 16 16	0 0 0
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria	18 17 17 16 16 16	0 0 0
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel	18 17 17 16 16 16 14	0 0 0
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of	18 17 17 16 16 16 14 12 8	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia	18 17 17 16 16 16 14 12 8 7	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia	18 17 17 16 16 16 14 12 8 7	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia	18 17 17 16 16 16 14 12 8 7 5	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia	18 17 16 16 16 14 12 8 7 5 5	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile	18 17 17 16 16 16 14 12 8 7 5	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt	18 17 16 16 16 14 12 8 7 5 5	0 0 0
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan	18 17 17 16 16 16 14 12 8 7 5 5 5 5	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain	18 17 17 16 16 16 14 12 8 7 5 5 5	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth.	18 17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana	18 17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon	18 17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco	18 17 17 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of	18 17 17 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa	18 17 17 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2	0 0 0 •
Serbia and Montenegro Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa Philippines	18 17 17 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2 2	· · · · · · · · · · · · · · · · · · ·

## Country average vs. International average:

Higher
Not different
Lower

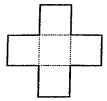
5 squares: perimeter whole figure (continued)

Item Number: M022227C

### **Student Responses**

### **Correct Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.

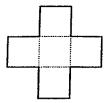


c. Find the perimeter of the whole figure in centimeters.



### **Incorrect Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.



c. Find the perimeter of the whole figure in centimeters.

Answer: 49 cm

Content Domain	Main Topic	Cognitive Domain
A. MEASUREMENT B. MEASUREMENT	Tools, Techniques, and Formulas Tools, Techniques, and Formulas	Solving Routine Problems Reasoning

### Car rally: average speed

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.
A. What must the average speed be to travel the 160 km in this time?
Answer:
B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.
What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?
Answer:

#### Item Number: M032649A

#### **SCORING**

#### **Correct Response**

• 64 kph or 64 or equivalent.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible or off task).

### **Overall Percent Correct**

Cinganoro	70	
Singapore	78 76	<b>A</b>
Hong Kong, SAR Netherlands	76 70	<b>A</b>
Russian Federation	67	<u> </u>
Armenia	65	<b>A</b>
Estonia	64	
Chinese Taipei	59	
Japan	59	
Hungary	59	
Lithuania	56	
United States	55	
Belgium (Flemish)	54	
Latvia	50	
Slovak Republic	49	
Sweden	45	
Korea, Republic of	43	
Scotland	43	
Italy	42	
Moldova, Republic of	38	0
England	37	0
Norway	37	0
Australia	36	0
Israel	36	0
New Zealand	35	0
International average	35	
International average Serbia and Montenegro	<b>35</b>	0
International average Serbia and Montenegro Slovenia	34	0
Serbia and Montenegro Slovenia		0 0 •
Serbia and Montenegro Slovenia Malaysia	34 33 29	O ▼
Serbia and Montenegro Slovenia Malaysia Romania	34 33 29 29	<ul><li>○</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria	34 33 29 29 28	<ul><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia	34 33 29 29 28 27	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of	34 33 29 29 28 27 26	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan	34 33 29 29 28 27 26 24	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li><!--</td--></li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia	34 33 29 29 28 27 26 24	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana	34 33 29 29 28 27 26 24 22 21	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth.	34 33 29 29 28 27 26 24 22 21	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus	34 33 29 29 28 27 26 24 22 21 18	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon	34 33 29 29 28 27 26 24 22 21 18 16	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile	34 33 29 29 28 27 26 24 22 21 18 16 15	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><!--</td--></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines	34 33 29 29 28 27 26 24 22 21 18 16 15 15	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain	34 33 29 29 28 27 26 24 22 21 18 16 15 15 14	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of	34 33 29 29 28 27 26 24 22 21 18 16 15 15 14 12 8	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt	34 33 29 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt South Africa	34 33 29 29 28 27 26 24 22 21 18 16 15 15 15 14 12 8 7	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt South Africa Morocco	34 33 29 29 28 27 26 24 22 21 18 16 15 15 15 17 6	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt South Africa Morocco Saudi Arabia	34 33 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7 6	O V
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt South Africa Morocco	34 33 29 29 28 27 26 24 22 21 18 16 15 15 15 17 6	· · · · · · · · · · · · · · · · · · ·

Country average vs. International average:

Higher	
Not different	C
Lower	•

Car rally: average speed (continued)

Item Number: M032649A

### **Student Responses**

#### **Correct Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

A. What must the average speed be to travel the 160 km in this time?

Answer: 64 Km

#### **Incorrect Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

A. What must the average speed be to travel the 160 km in this time?

Answer:

Content Domain	Main Topic	Cognitive Domain
A. MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems
B. MEASUREMENT	Tools, Techniques, and Formulas	Reasoning

### Car rally: average speed for one section

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.
A. What must the average speed be to travel the 160 km in this time?
Answer:
B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.
What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?
Answer:

#### Item Number: M032649B

#### **SCORING**

#### **Correct Response**

• 80 kph or 80

#### **Incorrect Response**

- 5, 2, 120 or 48 shown.
- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

### **Overall Percent Correct**

Armenia	54	
Singapore	52	
Netherlands	50	
Hong Kong, SAR	47	
Chinese Taipei	39	
Estonia	35	
Russian Federation	34	<u> </u>
Hungary	33	<u> </u>
Japan	33	<u> </u>
Belgium (Flemish)	30	<u> </u>
Sweden	28	_
Lithuania	27	<b>A</b>
Korea, Republic of	27	<u> </u>
Latvia	24	
United States	24	
Scotland	23	
England	22	0
Australia	22	0
Slovak Republic	21	0
New Zealand	19	O
Norway	19	0
International average	18	
Israel	17	O
NA 1.1 D. 1.11 C	17	0
Moldova, Republic of	17	U
Bulgaria	17	0
· '		
Bulgaria	17	0
Bulgaria Slovenia	17 16	0
Bulgaria Slovenia Italy	17 16 15	0
Bulgaria Slovenia Italy Romania	17 16 15 13	0 0 0
Bulgaria Slovenia Italy Romania Serbia and Montenegro	17 16 15 13 10	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia	17 16 15 13 10 8	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of	17 16 15 13 10 8 7	<ul><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li></ul>
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan	17 16 15 13 10 8 7 6	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus	17 16 15 13 10 8 7 6	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia	17 16 15 13 10 8 7 6 6 5	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile	17 16 15 13 10 8 7 6 6 5 5	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt	17 16 15 13 10 8 7 6 6 5 5	<ul><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li></ul>
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana	17 16 15 13 10 8 7 6 6 5 5 4 4	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain	17 16 15 13 10 8 7 6 6 5 5 5 4 4	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia	17 16 15 13 10 8 7 6 6 5 5 5 4 4 4	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth.	17 16 15 13 10 8 7 6 6 5 5 5 4 4 4 4	0 0 0 •
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa	17 16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3	0 0 0 0 1 1 1 1
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon	17 16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3 2	0 0 0 0 1 1 1 1
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines	17 16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3 2 2	0 0 0 0 1 1 1 1
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines Saudi Arabia	17 16 15 13 10 8 7 6 6 5 5 4 4 4 4 4 4 3 2 2	0 0 0 0 1 1 1 1
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines Saudi Arabia Ghana	17 16 15 13 10 8 7 6 6 5 5 4 4 4 4 4 4 3 2 2 1	0 0 0 0 1 1 1 1 1
Bulgaria Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines Saudi Arabia	17 16 15 13 10 8 7 6 6 5 5 4 4 4 4 4 4 3 2 2	0 0 0 •

## Country average vs. International average:

Higher
Not different
Lower

Car rally: average speed for one section (continued)

Item Number: M032649B

### **Student Responses**

#### **Correct Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.

What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?

Answer: 60 Km

### **Incorrect Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.

What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?

Answer: 3 Kilometers

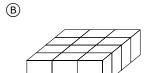
Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Using Concepts

### Volumes of stacks of blocks

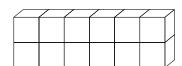
All the small blocks are the same size. Which stack of blocks has a different volume from the others?

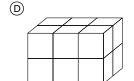












Item Number: M012013

**Correct Response:** 

A

### **Overall Percent Correct**

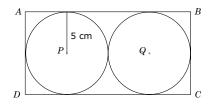
Korea, Republic of	88	
Singapore	86	
Hong Kong, SAR	83	
Japan	81	
Chinese Taipei	81	
Netherlands	78	
Australia	73	
Estonia	69	
Slovak Republic	68	
Belgium (Flemish)	67	
Scotland	67	
Lithuania	66	
Latvia	64	
Malaysia	62	
Slovenia	62	
New Zealand	60	
Hungary	58	
England	58	
Russian Federation	57	
Norway	56	
Italy	55	
United States	50	Ο
International average	50	

Officed States	50	U
International average	50	
Sweden	50	O
Israel	49	0
Bulgaria	48	0
Moldova, Republic of	48	0
Romania	46	0
Serbia and Montenegro	45	$\blacksquare$
Armenia	42	$\blacksquare$
Cyprus	42	$\blacksquare$
Bahrain	41	$\blacksquare$
Philippines	35	* * * * * * * * * * * * * * * * * * *
Lebanon	34	$\blacksquare$
Macedonia, Republic of	33	$\blacksquare$
Saudi Arabia	32	* * * * * * * * * * * * * * * * * * *
Indonesia	32	$\blacksquare$
Palestinian Nat'l Auth.	30	$\blacksquare$
Jordan	29	$\blacksquare$
Chile	27	$\blacksquare$
Morocco	26	$\blacksquare$
Botswana	26	$\blacksquare$
Tunisia	26	<b>V</b>
Iran, Islamic Republic of	26	$\blacksquare$
Egypt	24	<b>V</b>
South Africa	22	$\blacksquare$
Ghana	20	$\blacksquare$
I		

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Using Concepts

### The area of the rectangle ABCD



In the figure above, ABCD is a rectangle, and circles P and Q each have a radius of 5 cm. What is the area of the rectangle?

- $\bigcirc$  50 cm<sup>2</sup>
- (B) 60 cm<sup>2</sup>
- $\bigcirc$  100 cm<sup>2</sup>
- 200 cm<sup>2</sup>

Item Number: M032678

**Correct Response:** 

D

### **Overall Percent Correct**

Cinganoro	82	
Singapore Hong Kong, SAR	82	<b>A</b>
J 3.	62 75	
Korea, Republic of Chinese Taipei	73 74	<b>A</b>
'		
Japan National and a selection	73	<b>A</b>
Netherlands	65	<u> </u>
Belgium (Flemish)	61	<u> </u>
Estonia	53	<b>A</b>
Russian Federation	51	<b>A</b>
Italy	51	<b>A</b>
Slovak Republic	51	<b>A</b>
Hungary	48	<b>A</b>
Malaysia	48	<b>A</b>
Latvia	46	<b>A</b>
Lithuania	45	<b>A</b>
Sweden	45	
Scotland	44	<b>A</b>
England	43	0
Serbia and Montenegro	43	0
Australia	42	0
New Zealand	41	0
Slovenia	41	0
Romania	39	0
Romania International average	39 <b>39</b>	0
		0
International average	39	
International average United States	<b>39</b>	0
International average United States Bulgaria	<b>39</b> 39 38	0
International average United States Bulgaria Cyprus	39 39 38 37	0 0
International average United States Bulgaria Cyprus Armenia Lebanon	39 39 38 37 36	0 0 0
International average United States Bulgaria Cyprus Armenia	39 39 38 37 36 35	0 0 0 0
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel	39 38 37 36 35 35	0 0 0 0 0
United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of	39 38 37 36 35 35 34 33	0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia	39 38 37 36 35 35 34 33 30	0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of	39 38 37 36 35 35 34 33 30	0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of	39 38 37 36 35 35 34 33 30 30 27	0 0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan	39 39 38 37 36 35 35 34 33 30 27 25	0 0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia	39 39 38 37 36 35 35 34 33 30 27 25 24	0 0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt	39 39 38 37 36 35 35 34 33 30 27 25 24 21	0 0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain	39 39 38 37 36 35 34 33 30 27 25 24 21 20	0 0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain Morocco	39 39 38 37 36 35 34 33 30 27 25 24 21 20 19	0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain Morocco Palestinian Nat'l Auth.	39 39 38 37 36 35 34 33 30 27 25 24 21 20 19 18	0 0 0 0 0 0 0 0 0 0 0
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain Morocco Palestinian Nat'l Auth. Chile	39 39 38 37 36 35 34 33 30 27 25 24 21 20 19 18 18	0 0 0 0 0 •
International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain Morocco Palestinian Nat'l Auth.	39 39 38 37 36 35 34 33 30 27 25 24 21 20 19 18	0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

10

10

Ghana

South Africa

Saudi Arabia

Higher
Not different
Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

### Pair of numbers bracketing 2.25

In which of these pairs of numbers is 2.25 larger than the first number but smaller than the second number?

- (A) 1 and 2
- $\bigcirc$   $\frac{5}{2}$  and  $\frac{11}{4}$

Item Number: M012016

**Correct Response:** 

D

### **Overall Percent Correct**

Korea, Republic of	77	
Singapore	71	
Belgium (Flemish)	63	
Lithuania	61	
Hong Kong, SAR	61	
Chinese Taipei	60	
Russian Federation	58	
Hungary	58	<b>A</b>
Estonia	57	
Israel	57	
Slovak Republic	55	
Japan	55	
Sweden	55	0
United States	54	<u> </u>
Serbia and Montenegro	54	0
Slovenia	53	0
Romania	52	0
Italy	52	0
Australia	52	0
Latvia	52	0
Philippines	52 51	0
Netherlands	51 51	0
Scotland	51	U
Management	Г1	_
Norway	51 E1	0
Cyprus	51	0
Cyprus International average	51 <b>50</b>	0
Cyprus International average Bulgaria	51 <b>50</b> 50	0
Cyprus International average Bulgaria Malaysia	51 <b>50</b> 50 50	0 0
Cyprus International average Bulgaria Malaysia England	51 50 50 50 50	0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of	51 50 50 50 50 48	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand	51 50 50 50 50 48 47	0 0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana	51 50 50 50 50 48 47 46	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia	51 50 50 50 50 48 47 46 46	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia	51 50 50 50 50 48 47 46 46 46	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon	51 50 50 50 50 48 47 46 46 46 45	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana	51 50 50 50 50 48 47 46 46 46 45 44	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of	51 50 50 50 50 48 47 46 46 46 45 44	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana	51 50 50 50 50 48 47 46 46 46 45 44	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco	51 50 50 50 50 48 47 46 46 46 45 44 44 43	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41 40	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41 40 40	0 0 0 0 0 0 0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41 40 40 39	0 0 0 0 0 0 0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa Chile	51 50 50 50 50 48 47 46 46 46 45 44 43 41 40 40 39 39	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa Chile Palestinian Nat'l Auth.	50 50 50 50 48 47 46 46 46 45 44 43 41 40 40 39 39 39	0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

O ▼

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

## Scoops of flour needed to fill bag

A scoop holds $\frac{1}{5}$ kg of flour. How many scoops of flour are needed to fill a bag with 6 kg of flour?
Answer:

Item Number: M022156

### **SCORING**

### **Correct Response**

• 30

### **Incorrect Response**

- 30 kg [incorrect unit]
- 6/5 [6 x 1/5]
- 4 [4/5 more needed to complete 1 kg]
- 5 [5 scoops = 1 kg flour]
- 6 [from stem]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Singapore	79	
Hong Kong, SAR	76	
Chinese Taipei	75	
Netherlands	74	
Korea, Republic of	68	
Japan	62	
Belgium (Flemish)	62	
Sweden	60	
Australia	53	
United States	52	
Scotland	51	
Estonia	51	<b>A</b>
Latvia	51	<b>A</b>
Hungary	51	<b>A</b>
England	50	<b>A</b>
Russian Federation	49	<b>A</b>
Israel	48	<b>A</b>
Malaysia	47	<b>A</b>
New Zealand	46	<b>A</b>
Slovenia	46	<b>A</b>
Armenia	45	<b>A</b>
Lithuania	43	<b>A</b>
Slovak Republic	43	<b>A</b>
Norway	39	0
	20	0
Romania	39	
Serbia and Montenegro	38	0
Serbia and Montenegro Bulgaria	38 38	
Serbia and Montenegro Bulgaria International average	38 38 <b>38</b>	0
Serbia and Montenegro Bulgaria International average Cyprus	38 38 <b>38</b> 37	0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of	38 38 38 37 37	0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy	38 38 38 37 37 34	0 0 0 0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia	38 38 37 37 34 26	0 0 0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of	38 38 37 37 34 26 22	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of	38 38 37 37 34 26 22 20	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia	38 38 37 37 34 26 22 20 18	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt	38 38 37 37 34 26 22 20 18 17	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan	38 38 37 37 34 26 22 20 18 17	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon	38 38 37 37 34 26 22 20 18 17 16	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile	38 38 37 37 34 26 22 20 18 17 16 15	0 0 0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines	38 38 37 37 34 26 22 20 18 17 16 15 13	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain	38 38 37 37 34 26 22 20 18 17 16 15 13 13	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana	38 38 37 37 34 26 22 20 18 17 16 15 13 11	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth.	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11 10 8	0 0 0 0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco South Africa	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11 10 8 7	0 0 0 0 •
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco South Africa Saudi Arabia	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11 10 8 7	0 0 0 0 •

## Country average vs. International average:

Higher	
Not different	0
Lower	_

## Scoops of flour needed to fill bag (continued)

Item Number: M022156

## **Student Responses**

### **Correct Response:**

A scoop holds  $\frac{1}{5}$  kilograms of flour. How many scoops of flour are needed to fill a bag with 6 kilograms of flour?

Answer: 30 3600 p5

### **Incorrect Response:**

A scoop holds  $\frac{1}{5}$  kilograms of flour. How many scoops of flour are needed to fill a bag with 6 kilograms of flour?

Answer: 30

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

## Addition/multiplication with fractions

$$\frac{3}{5} + (\frac{3}{10} \times \frac{4}{15}) =$$

- $\bigcirc \quad \frac{3}{51}$
- $\bigcirc$   $\frac{1}{6}$
- $\bigcirc \quad \frac{6}{25}$

Item Number: M022199

**Correct Response:** 

Ε

## **Overall Percent Correct**

Chinese Taipei Korea, Republic of Japan Singapore Hong Kong, SAR Egypt Romania Italy Belgium (Flemish) Slovenia Slovak Republic Hungary Estonia Malaysia Bulgaria Russian Federation Latvia Serbia and Montenegro	82 80 75 72 69 58 54 53 51 51 50 50 48 48 48 46 45	
Belgium (Flemish)	53	
*	48	
-	48	
Latvia	46	
Serbia and Montenegro	45	
Lithuania	44	
Armenia	42	0
International average	40	
Lebanon	40	0
Israel Netherlands	40 40	0
Netrienanus	40	U
Moldova Ropublic of	30	$\circ$
Moldova, Republic of	39 36	0
Cyprus	36	$\blacksquare$
		$\blacksquare$
Cyprus United States Jordan	36 36	$\blacksquare$
Cyprus United States	36 36 35	$\blacksquare$
Cyprus United States Jordan Iran, Islamic Republic of	36 36 35 34	$\blacksquare$
Cyprus United States Jordan Iran, Islamic Republic of Bahrain	36 36 35 34 29	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia	36 36 35 34 29 28	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand	36 36 35 34 29 28	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth.	36 36 35 34 29 28 28 28 28	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of	36 36 35 34 29 28 28 28 28 27 27	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia	36 36 35 34 29 28 28 28 28 27 27 26	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland	36 36 35 34 29 28 28 28 28 27 27 26 26	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco	36 36 35 34 29 28 28 28 27 27 26 26 25	$\blacksquare$
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco Botswana	36 36 35 34 29 28 28 28 27 27 26 26 25 24	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco Botswana Sweden	36 36 35 34 29 28 28 28 27 27 26 26 25 24	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco Botswana	36 36 35 34 29 28 28 28 27 27 26 26 25 24 22	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco Botswana Sweden Philippines	36 36 35 34 29 28 28 28 27 27 26 26 25 24	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco Botswana Sweden Philippines Chile	36 36 35 34 29 28 28 28 27 27 26 26 25 24 22 22	* * * * * * * * * * * * * * * * * * *
Cyprus United States Jordan Iran, Islamic Republic of Bahrain Australia Indonesia England New Zealand Palestinian Nat'l Auth. Macedonia, Republic of Tunisia Scotland Morocco Botswana Sweden Philippines Chile Norway	36 36 35 34 29 28 28 28 27 27 26 25 24 22 21 21	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Reasoning

## Number of men/women at meeting

Two-thirds of the people present at the beginning of a meeting are men. Nobody leaves but 10 more men and 10 more women arrive at the meeting. Which of the following statements is true?

- (A) There would then be more men than women at the meeting.
- (B) There would then be the same number of men as there are women at the meeting.
- © There would then be more women than men at the meeting.
- © From the information given, you cannot tell whether there would be more women or men.

Item Number: M022191

**Correct Response:** 

۸

### **Overall Percent Correct**

Korea, Republic of	89	
Japan	87	<u> </u>
Netherlands	86	<u> </u>
Belgium (Flemish)	83	<u> </u>
Singapore	81	<u> </u>
Sweden	79	<u> </u>
Norway	77	<u> </u>
Chinese Taipei	77	
Malaysia	74	<b>A</b>
Hong Kong, SAR	73	
Hungary	73 71	
<b>J</b> ,		
Italy	70	
Slovenia	68	<b>A</b>
Slovak Republic	68	<u> </u>
Estonia	67	<u> </u>
Scotland	67	<b>A</b>
England	67	<b>A</b>
Bulgaria	67	<b>A</b>
Australia	66	<b>A</b>
Israel	65	<b>A</b>
Cyprus	64	<b>A</b>
Serbia and Montenegro	63	<b>A</b>
New Zealand	63	0
Latvia	62	0
and the second s		
Lithuania	60	0
International average	59	
International average Russian Federation	<b>59</b> 57	0
International average Russian Federation Moldova, Republic of	<b>59</b> 57 56	0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of	<b>59</b> 57 56 56	0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States	59 57 56 56 56	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of	<b>59</b> 57 56 56	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States	59 57 56 56 56	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile	59 57 56 56 52 51	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan	59 57 56 56 52 51 51	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia	59 57 56 56 52 51 51 50	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania	59 57 56 56 52 51 51 50 48	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain	59 57 56 56 52 51 51 50 48 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco	59 57 56 56 52 51 51 50 48 46 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt	59 57 56 56 52 51 51 50 48 46 46 46	0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco	59 57 56 56 52 51 51 50 48 46 46 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of	59 57 56 56 52 51 50 48 46 46 46 46 45 42	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana	59 57 56 56 52 51 51 50 48 46 46 46 46 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia	59 57 56 56 52 51 51 50 48 46 46 46 46 45 42	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia	59 57 56 56 52 51 51 50 48 46 46 46 45 42 40 40 37	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana	59 57 56 56 52 51 51 50 48 46 46 46 45 42 40 40 37 31	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana Philippines	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana Philippines Lebanon	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27 24	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana Philippines	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

## Fraction of hour between two time points

What fraction of an hour has passed between 1:10 a.m. and 1:30 a.m.?

- $\bigcirc A \quad \frac{1}{5}$
- $\bigcirc$   $\frac{1}{2}$
- $\bigcirc \quad \frac{2}{3}$
- $\bigcirc$   $\frac{3}{4}$

Item Number: M012027

**Correct Response:** 

В

## **Overall Percent Correct**

Singapore	85	
Hong Kong, SAR	80	<b>A</b>
Korea, Republic of	77	<b>A</b>
Chinese Taipei	77	
Sweden	73	
England	68	
Netherlands	67	<b>A</b>
Japan	67	
Belgium (Flemish)	66	<b>A</b>
Hungary	66	<b>A</b>
Australia	65	
Slovak Republic	64	
Scotland	63	
United States	62	
Latvia	62	
Israel	61	
Malaysia	61	
New Zealand	60	
Slovenia	58	
Norway	57	
Bulgaria	56	-
Bulgaria Cyprus	56 56	
Cyprus Estonia		
Cyprus Estonia Russian Federation	56 55 53	
Cyprus Estonia Russian Federation International average	56 55 53 <b>52</b>	<ul><li>O</li><li>O</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of	56 55 53 <b>52</b> 52	0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia	56 55 53 <b>52</b> 52 50	0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania	56 55 53 <b>52</b> 52 50 50	0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro	56 55 53 <b>52</b> 52 50 50 48	0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan	56 55 53 <b>52</b> 52 50 50 48 46	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania	56 55 53 <b>52</b> 52 50 50 48 46 43	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth.	56 55 53 <b>52</b> 52 50 50 48 46 43 43	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt	56 55 53 <b>52</b> 52 50 50 48 46 43 43 43	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy	56 55 53 <b>52</b> 50 50 48 46 43 43 43 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon	56 55 53 <b>52</b> 50 50 48 46 43 43 43 41 40	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines	56 55 53 <b>52</b> 52 50 50 48 46 43 43 43 41 40 40	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of	56 55 53 <b>52</b> 52 50 50 48 46 43 43 43 41 40 40 40	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain	56 55 53 52 52 50 50 48 46 43 43 43 41 40 40 40 40	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of	56 55 53 <b>52</b> 52 50 50 48 46 43 43 41 40 40 40 40 38	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li></ul>
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain	56 55 53 52 52 50 50 48 46 43 43 43 41 40 40 40 40	0 0 0 0

Country average vs. International average:

Botswana Chile

South Africa

Morocco

Ghana

Tunisia

29

28

27

26

24

20

 $\blacktriangledown$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

## Fraction birthdays in first half of year

In a group of children, 16 have birthdays during the first half of the year, and 14 have birthdays during the second half of the year. What fraction of the group have birthdays during the first half of the year?

- $\bigcirc \quad \frac{14}{30}$
- ©  $\frac{16}{14}$
- $\bigcirc$   $\frac{16}{30}$

Item Number: M012041

**Correct Response:** 

D

### **Overall Percent Correct**

K D III (	00	
Korea, Republic of	90	<u> </u>
Singapore	90	<u> </u>
Hong Kong, SAR	86	<u> </u>
Netherlands	82	<u> </u>
Chinese Taipei	79	<b>A</b>
Belgium (Flemish)	76	<b>A</b>
Sweden	76	<b>A</b>
England	75	<b>A</b>
Malaysia	75	<b>A</b>
Israel	74	<b>A</b>
United States	72	<b>A</b>
Norway	71	<b>A</b>
Australia	69	<b>A</b>
New Zealand	69	<b>A</b>
Scotland	69	<b>A</b>
Japan	68	<b>A</b>
Estonia	62	<b>A</b>
Slovenia	60	
Cyprus	59	
Hungary	58	
Italy	57	
Latvia	57	
Lithuania	57	0
Russian Federation	55	0
Slovak Republic	54	Ο
Slovak Republic International average	54 <b>52</b>	0
		<ul><li>○</li><li>▼</li></ul>
International average	52	<b>V</b>
International average Iran, Islamic Republic of	<b>52</b> 46	<b>V</b>
International average Iran, Islamic Republic of Bulgaria	<b>52</b> 46 43	<b>V</b>
International average Iran, Islamic Republic of Bulgaria Romania	<b>52</b> 46 43 41	<b>V</b>
International average Iran, Islamic Republic of Bulgaria Romania Botswana	<b>52</b> 46 43 41 40	<b>V</b>
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of	<b>52</b> 46 43 41 40 38	<b>V</b>
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan	52 46 43 41 40 38 37	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile	46 43 41 40 38 37 36	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia	46 43 41 40 38 37 36 36	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt	46 43 41 40 38 37 36 36 35	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon	52 46 43 41 40 38 37 36 36 35 33	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth.	52 46 43 41 40 38 37 36 36 35 33 31	<b>V</b>
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of	52 46 43 41 40 38 37 36 36 35 33 31 31	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro	52 46 43 41 40 38 37 36 36 35 33 31 31	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia	52 46 43 41 40 38 37 36 36 35 33 31 31 31	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain	52 46 43 41 40 38 37 36 36 35 33 31 31 31 31	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines	52 46 43 41 40 38 37 36 36 35 33 31 31 31 30 28	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia Morocco	52 46 43 41 40 38 37 36 36 35 33 31 31 31 30 28 27 21	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia Morocco South Africa	52 46 43 41 40 38 37 36 36 35 31 31 31 31 30 28 27 21 21	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia Morocco	52 46 43 41 40 38 37 36 36 35 33 31 31 31 30 28 27 21 21 20	* * * * * * * * * * * * * * * * * * *
International average Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia Morocco South Africa Ghana	52 46 43 41 40 38 37 36 36 35 31 31 31 31 30 28 27 21 21	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

### 4/5 of books more than 2/3

A teacher and a doctor each have 45 books. If  $\frac{4}{5}$  of the teacher's books and  $\frac{2}{3}$  of the doctor's books are novels, how many more novels does the teacher have than the doctor?

- A) 2
- (B) 3
- (c) 6
- D 30
- (E) 36

Item Number: M022004

**Correct Response:** 

0

### **Overall Percent Correct**

Singapore	85	<b>A</b>
Korea, Republic of	80	<b>A</b>
Hong Kong, SAR	78	<b>A</b>
Chinese Taipei	78	
Malaysia	69	
Netherlands	68	
Japan	66	<b>A</b>
Sweden	65	
Belgium (Flemish)	63	
Scotland	61	<b>A</b>
Hungary	60	<b>A</b>
England	57	<b>A</b>
Latvia	57	
Slovenia	57	
Italy	56	
Estonia	54	<b>A</b>
Romania	53	<b>A</b>
Australia	53	<b>A</b>
Slovak Republic	52	0
Israel	52	0
Cyprus	51	0
Lithuania	50	0
New Zealand	50	0
United States	50	0
Bulgaria	49	0
Bulgaria Serbia and Montenegro	49 48	0 0
_		
Serbia and Montenegro	48	0
Serbia and Montenegro International average	48 <b>48</b>	0 0 0
Serbia and Montenegro International average Russian Federation	48 <b>48</b> 45	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of	48 48 45 44	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway	48 48 45 44 43	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of	48 48 45 44 43 38	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia	48 48 45 44 43 38 38	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of	48 48 45 44 43 38 38 38	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt	48 45 44 43 38 38 38 37	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines	48 45 44 43 38 38 38 37 35	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia	48 45 44 43 38 38 38 37 35 35	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth.	48 45 44 43 38 38 38 37 35 35 34	0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana	48 45 44 43 38 38 38 37 35 35 34 33	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan	48 45 44 43 38 38 37 35 35 34 33 33	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile	48 45 44 43 38 38 38 37 35 35 34 33 33 33	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon	48 45 44 43 38 38 38 37 35 35 34 33 33 33 28	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain	48 45 44 43 38 38 38 37 35 35 34 33 33 28 27	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa	48 45 44 43 38 38 37 35 35 34 33 33 28 27 27	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa Ghana Tunisia Morocco	48 45 44 43 38 38 37 35 34 33 33 33 28 27 27 25 25 24	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa Ghana Tunisia	48 45 44 43 38 38 37 35 34 33 33 33 28 27 27 25 25	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

## Time for Betty to run race

Alice ran a race in 49.86 seconds. Betty ran the same race in 52.30 seconds. How much longer did it take Betty to run the race than Alice?

- (A) 2.44 seconds
- $\bigcirc$  2.54 seconds
- © 3.56 seconds
- $\bigcirc$  3.76 seconds

Item Number: M022010

Correct Response: A

## **Overall Percent Correct**

Singapore	88	<b>A</b>
Korea, Republic of	87	<b>A</b>
Malaysia	81	$\blacktriangle$
Netherlands	81	$\blacktriangle$
Hungary	80	$\blacktriangle$
Chinese Taipei	80	$\blacktriangle$
Japan	78	$\blacktriangle$
Russian Federation	76	<b>A</b>
Hong Kong, SAR	75	<b>A</b>
Slovak Republic	74	<b>A</b>
United States	74	
Slovenia	73	<b>A</b>
Estonia	72	<b>A</b>
Belgium (Flemish)	71	<b>A</b>
Scotland	71	<b>A</b>
Moldova, Republic of	69	<b>A</b>
Serbia and Montenegro	68	<b>A</b>
Latvia	67	
Bulgaria	66	<b>A</b>
Lithuania	65	<b>A</b>
Romania	64	0
Tunisia	63	0
Australia	63	0
Sweden	63	0
Italy	62	0
ltaly Botswana	62 61	0
Botswana Lebanon	61 61	- 1
Botswana Lebanon International average	61 61	0
Botswana Lebanon International average Armenia	61 61 <b>61</b>	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of	61 61 <b>61</b> 60 59	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus	61 61 <b>61</b> 60 59 59	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt	61 61 60 59 59 58	0 0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel	61 61 61 60 59 59 58 58	0 0 0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia	61 61 61 60 59 59 58 58	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England	61 61 61 60 59 59 58 58 55 54	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand	61 61 60 59 59 58 58 55 54 53	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan	61 61 60 59 59 58 58 55 54 53 46	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway	61 61 60 59 58 58 55 54 53 46 46	0 0 0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines	61 61 60 59 58 58 55 54 53 46 46 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco	61 61 60 59 59 58 58 55 54 53 46 46 45 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain	61 61 60 59 58 58 55 54 53 46 46 45 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of	61 61 60 59 58 58 55 54 53 46 46 45 45 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile	61 61 60 59 58 58 55 54 53 46 46 45 45 45 44 42	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth.	61 61 60 59 58 58 55 54 46 45 45 45 44 42 37	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth. Ghana	61 61 60 59 58 58 55 54 53 46 45 45 45 44 42 37 32	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth. Ghana South Africa	61 61 60 59 58 58 55 54 53 46 45 45 45 44 42 37 32	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth. Ghana	61 61 60 59 58 58 55 54 53 46 45 45 45 44 42 37 32	0 0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

## Fuel remaining in tank at end of trip

A car has a fuel tank that holds 45 L of fuel. The car consumes 8.5 L of fuel for each 100 km driven. A trip of 350 km was started with a full tank of fuel. How much remained in the tank at the end of the trip?

- $\bigcirc$  15.25 L
- $\bigcirc$  16.25 L
- $\bigcirc$  24.75 L
- (D) 29.75 L

Item Number: M022127

**Correct Response:** 

Α

### **Overall Percent Correct**

Singapore	56	
Chinese Taipei	50	
Hong Kong, SAR	43	
Korea, Republic of	43	
Japan	38	
Netherlands	38	
Malaysia	34	
Moldova, Republic of	33	<u> </u>
Lithuania	32	<u> </u>
Hungary	32	
Estonia	31	
Romania	30	0
Belgium (Flemish)	30	<b>△</b>
Russian Federation	29	0
		0
Australia	28	
Armenia	27	0
Latvia	26	0
International average	26	
Slovenia	26	O
Macedonia, Republic of	25	O
United States	25	0
Slovak Republic	24	0
New Zealand	24	0
Indonesia	23	0
Sweden	23	O
Jordan	23	0
Bulgaria	23	0
Cyprus	22	•
Saudi Arabia	22	0
Israel	22	<b>V</b>
Serbia and Montenegro	22	* * * * * * * * * * * * * * * * * * *
Italy	21	·
Egypt	21	<u> </u>
Botswana	20	•
Chile	20	•
Ghana	20	<b>*</b>
		<b>*</b>
England	20	<u>*</u>
Scotland	19	<b>▼</b>
Morocco	19	_
Tunisia	19	_
South Africa	18	•
Iran, Islamic Republic of	18	
Palestinian Nat'l Auth.	17	•
Philippines	17	•
Bahrain	16	•
Norway	16	$\blacksquare$
Lebanon	12	$\blacksquare$

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

## John and Cathy to divide a number by 100

John and Cathy were told to divide a number by 100. By mistake John multiplied the number by 100 and obtained an answer of 450. Cathy correctly divided the number by 100. What was her answer?

- (A) 0.0045
- B 0.045
- © 0.45
- (D) 4.5

Item Number: M032079

**Correct Response:** 

В

## **Overall Percent Correct**

Singapore	58	
Belgium (Flemish)	58	
Estonia	56	
Japan	56	
Hong Kong, SAR	56	
Korea, Republic of	52	
Russian Federation	51	
Hungary	51	
Netherlands	51	
Chinese Taipei	46	
Slovak Republic	45	
Lithuania	43	
Israel	41	
Sweden	41	
Latvia	37	0
New Zealand	36	0
Australia	35	0
Scotland	35	0
International average	34	
Italy	34	0
England	34	0
Cyprus	33	0
Slovenia	32	0
United States	32	0
Moldova, Republic of	32	0
	32 32	0
Serbia and Montenegro		0
	32	0
Serbia and Montenegro Norway	32 31	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia	32 31 29	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt	32 31 29 28	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia	32 31 29 28 27	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia	32 31 29 28 27 27	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon	32 31 29 28 27 27 26 26	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia	32 31 29 28 27 27 26	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain	32 31 29 28 27 27 26 26 23	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of	32 31 29 28 27 27 26 26 23 23	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines	32 31 29 28 27 27 26 26 23 23 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile	32 31 29 28 27 27 26 26 23 23 23 23	0 0 <b>v</b>
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco	32 31 29 28 27 27 26 26 23 23 23 23 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana	32 31 29 28 27 27 26 26 23 23 23 23 23 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of	32 31 29 28 27 27 26 26 23 23 23 23 23 22 22	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana Bulgaria	32 31 29 28 27 27 26 26 23 23 23 23 23 22 22 22	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana Bulgaria Indonesia	32 31 29 28 27 27 26 26 23 23 23 23 23 22 22 22	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana Bulgaria Indonesia Palestinian Nat'l Auth.	32 31 29 28 27 27 26 26 23 23 23 23 23 22 22 22 21 21	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana Bulgaria Indonesia Palestinian Nat'l Auth. South Africa Tunisia	32 31 29 28 27 26 26 23 23 23 23 22 22 22 21 21 20	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Norway Romania Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana Bulgaria Indonesia Palestinian Nat'l Auth. South Africa	32 31 29 28 27 27 26 26 23 23 23 23 22 22 22 21 21 20 18	· · · · · · · · · · · · · · · · · · ·

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

## Number of squares in shaded fraction

In the figure, how many MORE small squares need to be shaded so that  $\frac{4}{5}$  of the small squares are shaded?

- $\bigcirc$  5

- $\bigcirc$  2
- E 1

Item Number: M012001

**Correct Response:** 

## **Overall Percent Correct**

Singapore	88	<b>A</b>
Hong Kong, SAR	87	<b>A</b>
Belgium (Flemish)	84	<b>A</b>
Korea, Republic of	82	<b>A</b>
Netherlands	80	<b>A</b>
Japan	79	<b>A</b>
Chinese Taipei	78	<b>A</b>
Sweden	71	<b>A</b>
Malaysia	67	<b>A</b>
Israel	67	<b>A</b>
Hungary	66	<b>A</b>
Australia	66	<b>A</b>
Scotland	63	<b>A</b>
Norway	62	<b>A</b>
England	62	<b>A</b>
United States	61	<b>A</b>
New Zealand	60	<b>A</b>
Slovenia	59	<b>A</b>
Estonia	59	<b>A</b>
Cyprus	56	<b>A</b>
Latvia	56	<b>A</b>
Russian Federation	52	0
Slovak Republic	52	0
Moldova, Republic of	50	0
Italy	50	0
International average	49	
International average Lithuania	<b>49</b> 47	0
International average Lithuania Bulgaria	<b>49</b> 47 46	0
International average Lithuania Bulgaria Romania	49 47 46 45	0 0 0
International average Lithuania Bulgaria Romania Armenia	49 47 46 45 42	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro	49 47 46 45 42 42	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of	49 47 46 45 42 42 41	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of	49 47 46 45 42 42 41 37	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan	49 47 46 45 42 42 41 37 32	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt	49 47 46 45 42 42 41 37 32 30	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth.	49 47 46 45 42 41 37 32 30 29	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia	49 47 46 45 42 41 37 32 30 29 26	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain	49 47 46 45 42 41 37 32 30 29 26 25	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines	49 47 46 45 42 41 37 32 30 29 26 25 23	0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon	49 47 46 45 42 41 37 32 30 29 26 25 23 22	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco	49 47 46 45 42 41 37 32 30 29 26 25 23 22 22	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile	49 47 46 45 42 41 37 32 30 29 26 25 23 22 22	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia South Africa	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19 16	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia South Africa Botswana	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19 16 16	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia South Africa	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19 16	0 0 0

Country average vs. International average:

0

 $\blacksquare$ 

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

### Fraction less than 4/9

Write a fraction that is less than $\frac{4}{9}$ .	
Answer:	

#### Item Number: M022012

### **SCORING**

### **Correct Response**

- A fraction with numerator smaller than 4 and denominator equal to 9, includes 3/9 = 1/3 OR 1/3.
- A fraction with numerator equal to 4 and denominator greater than 9, includes 4/10 = 2/5 OR 2/5.
- 3/8
- · Other correct fraction

### **Incorrect Response**

- 5/9
- 2/3
- Any fraction equivalent to 4/9.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Singapore	84	lack
Korea, Republic of	81	_
Japan	81	_ _
Hong Kong, SAR	79	<b>A</b>
Chinese Taipei	77	$\blacktriangle$
Israel	74	<b>A</b>
Hungary	72	<b>A</b>
Armenia	72	$\blacktriangle$
Australia	71	$\blacktriangle$
Sweden	70	$\blacktriangle$
United States	69	<b>A</b>
Netherlands	69	<b>A</b>
England	68	<b>A</b>
Slovak Republic	66	<b>A</b>
New Zealand	64	<b>A</b>
Norway	64	<b>A</b>
Slovenia	64	<b>A</b>
Estonia	63	<b>A</b>
Belgium (Flemish)	62	<b>A</b>
Russian Federation	62	<b>A</b>
Scotland	60	<b>A</b>
Cyprus	60	
International average	54	
	54	0
Romania		- 1
Bulgaria	54	0
Bulgaria Serbia and Montenegro	54 52	0
Bulgaria Serbia and Montenegro Egypt	54 52 52	0 0
Bulgaria Serbia and Montenegro Egypt Latvia	54 52 52 52	0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania	54 52 52 52 52 50	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth.	54 52 52 52 52 50 50	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana	54 52 52 52 52 50 50 49	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy	54 52 52 52 52 50 50 49	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan	54 52 52 52 50 50 49 48 48	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia	54 52 52 52 50 50 49 48 48 47	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of	54 52 52 52 50 50 49 48 48 47	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia	54 52 52 52 50 50 49 48 48 47 47 43	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain	54 52 52 52 50 50 49 48 48 47 47 43 41	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of	54 52 52 52 50 50 49 48 48 47 47 43 41 40	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia	54 52 52 52 50 50 49 48 47 47 43 41 40 39	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile	54 52 52 52 50 50 49 48 47 47 43 41 40 39 36	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile	54 52 52 52 50 50 49 48 47 47 43 41 40 39 36	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon Indonesia	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon Indonesia Philippines	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26 25	0 0 0 0

## Country average vs. International average:

Higher	
Not different	0
Lower	_

## Fraction less than 4/9 (continued)

Item Number: M022012

## **Student Responses**

### **Correct Response:**

Write a fraction that is less than  $\frac{4}{9}$ .

Answer:

### **Incorrect Response:**

Write a fraction that is less than  $\frac{4}{9}$ .

Answer:  $\frac{2}{3}$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

### Decimal rounded to nearest hundredth

Which of the following is 78.2437 rounded to the nearest hundredth?

- A 100
- B 80
- © 78.2
- (D) 78.24
- (E) 78.244

Item Number: M022144

**Correct Response:** 

D

## **Overall Percent Correct**

Korea, Republic of	88	<b>A</b>
Serbia and Montenegro	74	<b>A</b>
Russian Federation	73	<b>A</b>
Lithuania	72	
Hungary	72	
Slovak Republic	71	
Belgium (Flemish)	66	
United States	66	
Estonia	62	
Moldova, Republic of	55	
Sweden	55	<b>A</b>
Singapore	54	
Italy	54	<b>A</b>
Japan	54	_
Latvia	54	<u> </u>
Netherlands	54	<u> </u>
Chinese Taipei	49	0
Slovenia	49	0
	49	U
International average		_
Australia	47	0
Cyprus	46	0
Lebanon	45	0
Malaysia	45	0
Palestinian Nat'l Auth.	44	0
Israel	43	0
New Zealand	41	•
Egypt	41	•
Scotland	41	•
Jordan	40	<b>* * * * * * * * * *</b>
England	40	▼
Indonesia	39	$\blacksquare$
Philippines	38	$\blacksquare$
Bulgaria	38	▼
Iran, Islamic Republic of	37	<b>V</b>
Morocco	37	▼
Saudi Arabia	36	•
Romania	35	<b>V</b>
Norway	33	<b>V</b>
Bahrain	32	•
Darnani	22	*
Macedonia Republic of	32	_
Macedonia, Republic of	32 30	<b>V</b>
Chile	30	<b>V</b>
Chile Armenia	30 29	<b>▼ ▼ ▼</b>
Chile Armenia Ghana	30 29 29	<b>* * * *</b>
Chile Armenia Ghana Hong Kong, SAR	30 29 29 29	<b>*</b>
Chile Armenia Ghana Hong Kong, SAR Botswana	30 29 29 29 29	<b>* * * * * *</b>
Chile Armenia Ghana Hong Kong, SAR	30 29 29 29	* * * * * * * * * * * * * * * * * * *
Chile Armenia Ghana Hong Kong, SAR Botswana	30 29 29 29 29	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

## Decimals ordered greatest to least

In which list are the numbers ordered from greatest to least?

- $\bigcirc$  0.32, 0.233, 0.332, 0.3
- $\bigcirc$  0.332, 0.32, 0.3, 0.233

Item Number: M022198

**Correct Response:** 

D

## Overall Percent Correct

Singapore	79	
Belgium (Flemish)	74	
Hong Kong, SAR	72	
Netherlands	66	
Chinese Taipei	63	
Estonia	62	
Malaysia	62	
Korea, Republic of	59	
Sweden	59	
Latvia	58	
Japan	53	
Australia	53	
Slovak Republic	52	
Lithuania	49	
Russian Federation	49	
Scotland	48	0
United States	48	
Slovenia	48	0
Italy	47	0
Hungary	47	0
Bulgaria	47	0
Egypt	46	0
Romania	46	0
Moldova, Republic of	44	0
England	44	0
International average	44	
International average Armenia	<b>44</b> 42	0
International average Armenia Lebanon	<b>44</b> 42 42	0
International average Armenia	44 42 42 42	0 0
International average Armenia Lebanon	44 42 42 42 42 39	0 0 0
International average Armenia Lebanon New Zealand	44 42 42 42	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco	44 42 42 42 42 39	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel	44 42 42 42 39 38 38 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco	44 42 42 42 39 38 38 35 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan	44 42 42 42 39 38 38 35 35 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway	44 42 42 42 39 38 38 35 35 35 34	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia	44 42 42 42 39 38 38 35 35 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro	44 42 42 42 39 38 38 35 35 35 34	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia	44 42 42 42 39 38 38 35 35 35 34 33	0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth.	44 42 42 42 39 38 38 35 35 35 34 33 32 29	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia	44 42 42 42 39 38 35 35 35 35 34 33 32 29	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines	44 42 42 42 39 38 38 35 35 35 34 33 32 29 29 27 25	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia	44 42 42 42 39 38 38 35 35 35 34 33 32 29 29	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana	44 42 42 39 38 35 35 35 35 32 29 27 25 23 20	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana Iran, Islamic Republic of	44 42 42 42 39 38 35 35 35 35 32 29 29 27 25 23 20 18	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana Iran, Islamic Republic of Botswana	44 42 42 42 39 38 35 35 35 35 32 29 27 25 23 20 18 18	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana Iran, Islamic Republic of	44 42 42 42 39 38 35 35 35 35 32 29 29 27 25 23 20 18	0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

## The number closest to 10

Use the patterns in the previous table to answer the following questions.	
A. Pat made a shape with a <b>total</b> of 64 tiles. How many were black and how many were red?	
Answer: black tiles red tiles	
B. Pat made a shape that used 49 <b>black</b> tiles. How many <b>red</b> tiles did Pat use in that shape?	
Answer: red tiles	
C. Next, Pat made a shape using 44 of the <b>red</b> tiles. How many black tiles would Pat need to complete the black part of the shape?	
Answer: black tiles	

Item Number: M032670

**Correct Response:** 

В

## **Overall Percent Correct**

Netherlands	97	
Sweden	96	
Estonia	96	
Singapore	95	
Lithuania	95	
Belgium (Flemish)	94	
Korea, Republic of	94	
Malaysia	93	
Japan	92	
Serbia and Montenegro	91	
Norway	91	
Russian Federation	91	
Latvia	90	
Slovak Republic	90	
Italy	90	_ _
Hong Kong, SAR	89	_
Scotland	89	<u> </u>
Chinese Taipei	89	_
Cyprus	88	<u> </u>
Hungary	88	<u> </u>
Australia	88	<u> </u>
United States	87	
Slovenia	87	
New Zealand	86	
Bulgaria	85	
England	82	
Moldova, Republic of	82	
Israel	81	
Romania	79	0
	79 78	0
Macedonia, Republic of International average	76	
Tunisia	76	0
Morocco	75	0
Indonesia	74	0
Iran, Islamic Republic of	69	▼
Chile	67	÷
Lebanon	67	<b>▼</b>
Armenia	66	•
Jordan	55	<b>*</b>
Palestinian Nat'l Auth.	50	_
Bahrain	49	<b>*</b>
	49	_
Egypt	48 42	<b>*</b>
Philippines Potewana		<u>*</u>
Botswana Saudi Arabia	40 35	<b>*</b>
		* * * * * * * * * * * * * * * * * * *
South Africa Ghana	30 24	<u>*</u>
Gilalia	24	▼

Country average vs. International average:

**▲** ○ ▼

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Integers	Knowing Facts and Procedures

### The value of 1 minus 5 times -2

What is the value of  $1 - 5 \times (-2)$ ?

- A 11
- B) 8
- © -8
- D -9

Item Number: M032612

Correct Response: A

## **Overall Percent Correct**

Japan	74	
Singapore	70	
Hong Kong, SAR	67	
Chinese Taipei	66	<b>A</b>
Netherlands	61	
Belgium (Flemish)	55	
Korea, Republic of	54	
Slovak Republic	52	
Estonia	52	
Israel	52	
Romania	49	
New Zealand	48	
Russian Federation	46	
Bulgaria	46	
Australia	45	
Armenia	44	<b>A</b>
Latvia	42	
Hungary	42	<b>A</b>
Lebanon	42	
Malaysia	39	0
Botswana	39	0
Lithuania	38	0
United States	38	0
Italy	37	0
F	37	0
Egypt	5/	U
Slovenia	36	0
Slovenia International average	36 <b>35</b>	0
Slovenia International average Serbia and Montenegro	36	0
Slovenia International average Serbia and Montenegro Moldova, Republic of	36 <b>35</b>	0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of	36 35 33 33 32	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of	36 35 33 33 32 25	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of	36 35 33 33 32	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England	36 35 33 33 32 25	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia	36 35 33 33 32 25 24	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan	36 35 33 33 32 25 24 23	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines	36 35 33 32 25 24 23 21	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland	36 35 33 32 25 24 23 21 19	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa	36 35 33 32 25 24 23 21 19 19 18 17	0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland	36 35 33 32 25 24 23 21 19 19 18 17	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia	36 35 33 32 25 24 23 21 19 19 18 17	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain	36 35 33 32 25 24 23 21 19 19 18 17	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia	36 35 33 32 25 24 23 21 19 19 18 17 15	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia	36 35 33 32 25 24 23 21 19 19 18 17 15 12	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden	36 35 33 32 25 24 23 21 19 19 18 17 15 12 12	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10 6	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of Morocco	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10 6	0 0 0
Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of Morocco	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10 6	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Integers	Using Concepts

## If *n* is a negative integer

If n is a negative integer, which of these is the largest number?

- $\bigcirc$  3 + n
- (B)  $3 \times n$
- $\bigcirc$  3 n
- $\bigcirc$  3 ÷ n

Item Number: M032643

**Correct Response:** 

## **Overall Percent Correct**

K B 122 C		
Korea, Republic of	78	
Chinese Taipei	74	
Russian Federation	69	
Japan	68	
Hong Kong, SAR	67	
Singapore	58	
Hungary	53	
Estonia	51	
Latvia	49	
Belgium (Flemish)	48	
United States	48	
Israel	48	
Armenia	47	
Slovak Republic	46	
Serbia and Montenegro	46	
Netherlands	44	0
Bulgaria	42	O
Romania	41	0
Lebanon	41	0
Lithuania	40	0
Malaysia	40	0
International average	40	
Moldova, Republic of	39	0
Slovenia	38	0
Egypt	37	O
	37 36	0
Egypt		
Egypt Australia	36	O ▼
Egypt Australia Cyprus	36 34	○ ▼
Egypt Australia Cyprus Italy	36 34 32	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of	36 34 32 32	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines	36 34 32 32 32	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of	36 34 32 32 32 32	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand	36 34 32 32 32 32 31	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan	36 34 32 32 32 32 32 31 29	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth.	36 34 32 32 32 32 31 29	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden	36 34 32 32 32 32 31 29 29	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland	36 34 32 32 32 32 31 29 29 28 28	○ ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia	36 34 32 32 32 32 31 29 29 28 28 27	O ▼
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England	36 34 32 32 32 31 29 29 28 28 27 26	· · · · · · · · · · · · · · · · · · ·
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa	36 34 32 32 32 31 29 29 28 27 26 26	<ul><li>○</li><li>▼</li></ul>
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway	36 34 32 32 32 31 29 29 28 28 27 26 26 25	O V
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway Morocco	36 34 32 32 32 31 29 28 28 27 26 26 25 25	O V
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway Morocco Saudi Arabia	36 34 32 32 32 31 29 29 28 27 26 26 25 25	O V
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway Morocco Saudi Arabia Bahrain	36 34 32 32 32 31 29 29 28 27 26 26 25 25 25	· · · · · · · · · · · · · · · · · · ·
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway Morocco Saudi Arabia Bahrain Tunisia	36 34 32 32 32 31 29 28 28 27 26 26 25 25 25 22	O V
Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway Morocco Saudi Arabia Bahrain Tunisia Botswana	36 34 32 32 32 31 29 29 28 27 26 26 25 25 25 22 22	O V

Country average vs. International average:

**▲** ○ ▼

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Knowing Facts and Procedures

### Percent decrease in travel time

When a new highway is built, the average time it takes a bus to travel from one town to another is reduced from 25 minutes to 20 minutes. What is the percent decrease in time taken to travel between the two towns?

- A 4%
- (B) 5%
- (c) 20%
- (D) 25%

Item Number: M022139

**Correct Response:** 

0

### **Overall Percent Correct**

Singapore	70	
Netherlands	62	
Hong Kong, SAR	61	
Malaysia	48	
Sweden	47	
Australia	46	
Korea, Republic of	45	
Scotland	42	
England	42	
Hungary	40	
Chinese Taipei	40	
New Zealand	40	
Japan	39	
Slovak Republic	38	
Israel	38	
Slovenia	38	
Belgium (Flemish)	38	<b>A</b>
Estonia	37	
Latvia	37	<b>A</b>
United States	35	
Lithuania	34	0
Cyprus	34	0
Norway	34	0
Russian Federation	32	0
	-	_
Serbia and Montenegro	32	0
Serbia and Montenegro	32 <b>31</b>	0
International average	31	
International average Moldova, Republic of		0
International average	<b>31</b> 29	0
International average Moldova, Republic of Bulgaria	31 29 28	0
International average Moldova, Republic of Bulgaria Romania	31 29 28 27	0
International average Moldova, Republic of Bulgaria Romania Jordan	31 29 28 27 22	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa	29 28 27 22 21	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia	29 28 27 22 21 21	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy	31 29 28 27 22 21 21 20	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia	31 29 28 27 22 21 21 20 20	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of	29 28 27 22 21 21 20 20	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain	29 28 27 22 21 21 20 20 19	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia	29 28 27 22 21 21 20 20 19	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth.	29 28 27 22 21 21 20 20 19 19 19 18	0 0 V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of	29 28 27 22 21 21 20 20 19 19	0 0 V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon	29 28 27 22 21 21 20 20 19 19 18 18 18 18	0 0 V V V V V V V V V V V V V V V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt	29 28 27 22 21 21 20 20 19 19 19 18 18 18 17	0 0 V V V V V V V V V V V V V V V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines	29 28 27 22 21 21 20 20 19 19 18 18 18 18	0 0 V V V V V V V V V V V V V V V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt	29 28 27 22 21 20 20 19 19 19 18 18 18 17 17	0 0 V V V V V V V V V V V V V V V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia	29 28 27 22 21 20 20 19 19 19 18 18 18 17 17 17	0 0 V V V V V V V V V V V V V V V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia Morocco	29 28 27 22 21 20 20 19 19 19 18 18 18 17 17	0 0 V V V V
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia Morocco Ghana	29 28 27 22 21 20 20 19 19 18 18 18 17 17 17 17 15	0 0 V V V V V V V V V V V V V V V V V V

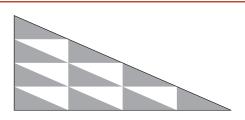
Country average vs. International average:

O ▼

Higher Not different Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Knowing Facts and Procedures

### The ratio of the shaded area to the unshaded



In the figure above, each of the smaller triangles has the same area. What is the ratio of the shaded area to the unshaded area?

- (A) 5:3
- B 8:5
- © 5:8
- (D) 3:5

Item Number: M032447

**Correct Response:** 

A

### **Overall Percent Correct**

Singapore	87	<b>A</b>
Chinese Taipei	81	
Korea, Republic of	80	
Hong Kong, SAR	74	
Malaysia	72	
Japan	71	
Slovak Republic	56	
Australia	55	
Scotland	54	
Latvia	52	
England	52	
Hungary	52	
Netherlands	51	
United States	50	
Lithuania	50	
Slovenia	48	
Serbia and Montenegro	48	
Russian Federation	47	
Indonesia	45	0
Bulgaria	44	0
Belgium (Flemish)	43	0
Estonia	42	0
International average	41	
New Zealand	39	0
Israel	38	O
Cyprus	37	O
Romania	37	0
Philippines	37	O
Moldova, Republic of	37	O
Italy	35	$\blacksquare$
Macedonia, Republic of	35	$\blacksquare$
Sweden	31	* * * * * * * * * * * * * * * * * * *
Armenia	28	$\blacksquare$
Palestinian Nat'l Auth.	27	$\blacksquare$
Iran, Islamic Republic of	26	

Country average vs. International average:

26

26

23

21

20

19 17

16

16

16 14

O ▼

Higher Not different Lower

Egypt

Norway

Jordan

Bahrain

Botswana South Africa

Morocco

Lebanon

Tunisia

Chile

Saudi Arabia

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Reasoning

## A computer club had 40 members

	members, and 60% of the members were girls. e club. What percent of the members now are girls? hat led to your answer.
Answer:	-

#### Item Number: M032233

### **SCORING**

#### **Correct Response**

• 48% with calculations shown.

### **Partial Response**

- 24 girls
- Correct method but computational error.
- 48% with no calculations shown.

#### **Incorrect Response**

- 50%
- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

## **Overall Percent Correct**

Singapore Korea, Republic of Chinese Taipei Hong Kong, SAR Hungary Malaysia Belgium (Flemish) Sweden Slovak Republic Estonia Netherlands Lithuania Japan England Scotland United States Australia Slovenia Israel New Zealand International average Latvia Serbia and Montenegro Armenia	64 44 41 29 28 23 21 19 19 18 16 16 14 14 13 13 13 12 <b>12</b> 9 9	
United States Australia	14 13	O O
New Zealand	12	
		0
		_
Romania	7	_
Russian Federation	7 6	<b>*</b>
Russian Federation	6	<b>*</b>
Russian Federation Italy	6 6	* * *
Russian Federation Italy Bulgaria	6 6 6	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus	6 6 6 4	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway	6 6 6 4 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile	6 6 6 4 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia	6 6 6 4 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon	6 6 6 4 3 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia	6 6 6 4 3 3 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa	6 6 6 4 3 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines	6 6 6 4 3 3 3 3 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of	6 6 6 4 3 3 3 3 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan	6 6 6 4 3 3 3 3 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth.	6 6 6 4 3 3 3 3 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt	6 6 6 4 3 3 3 2 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco	6 6 6 4 3 3 3 2 2 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana	6 6 6 4 3 3 3 2 2 2 2 2 2 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of Macedonia, Republic of	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1 1	* * * * * * * * * * * * * * * * * * *

## Country average vs. International average:

Higher	
Not different	0
Lower	_

### A computer club had 40 members (continued)

Item Number: M032233

## **Student Responses**

### **Correct Response:**

A computer club had 40 members, and 60% of the members were girls. Later, 10 boys joined the club. What percent of the members now are girls? Show the calculations that lead to your answer.

40.60% = 24 40.60% = 24 50 members 24 girls 26 boys 24/50

### **Partial Response:**

A computer club had 40 members, and 60% of the members were girls. Later, 10 boys joined the club. What percent of the members now are girls? Show the calculations that lead to your answer.

Answer: 48% 200 200 100 200 100

## **Incorrect Response:**

A computer club had 40 members, and 60% of the members were girls. Later, 10 boys joined the club. What percent of the members now are girls? Show the calculations that lead to your answer.

500/

ile boup

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## Laps run by Carol and Alice from ratio

Alice can run 4 laps around a track in the same time that Carol can run 3 laps. When Carol has run 12 laps, how many laps has Alice run?

- A 9
- B 11
- © 13
- (D) 16

Item Number: M012004

**Correct Response:** 

D

## **Overall Percent Correct**

Singapore	75	
Belgium (Flemish)	69	
Japan	68	
Chinese Taipei	66	
Netherlands	66	
Sweden	62	
Hong Kong, SAR	61	
Slovak Republic	59	
Latvia	55	<u> </u>
Lithuania	55	<u> </u>
Russian Federation	54	<u> </u>
Israel	53	<u> </u>
Australia	52	0
Norway	52	<b>▲</b>
Estonia	51	
Korea, Republic of	51	
	48	0
Iran, Islamic Republic of United States	48 48	0
Ghana		0
	47	0
International average	47	
Serbia and Montenegro	47	0
South Africa	47	O
Cyprus	46	O
Lebanon	46	O
New Zealand	46	0
Slovenia	46	0
England	45	O
Scotland	45	0
Hungary	43	$\blacksquare$
Malaysia	43	0
Palestinian Nat'l Auth.	43	$\blacksquare$
Armenia	42	$\blacksquare$
Philippines	42	$\blacksquare$
Tunisia	42	$\blacksquare$
Jordan	41	$\blacksquare$
Egypt	40	$\blacksquare$
Moldova, Republic of	40	* * * * * * * * * * * * * * * * * * *
·	39	$\blacksquare$
Botswana		
Botswana Romania	37	•
Romania		<b>V</b>
Romania Bulgaria	36	<b>* * *</b>
Romania Bulgaria Macedonia, Republic of	36 36	▼ ▼ ▼
Romania Bulgaria Macedonia, Republic of Italy	36 36 35	<b>* * * * *</b>
Romania Bulgaria Macedonia, Republic of Italy Saudi Arabia	36 36 35 35	* * * * * * * * * * * * * * * * * * *
Romania Bulgaria Macedonia, Republic of Italy Saudi Arabia Indonesia	36 36 35 35 34	* * * * * * * * * * * * * * * * * * *
Romania Bulgaria Macedonia, Republic of Italy Saudi Arabia Indonesia Morocco	36 36 35 35 34 33	* * * * * * * * * * * * * * * * * * *
Romania Bulgaria Macedonia, Republic of Italy Saudi Arabia Indonesia Morocco Chile	36 36 35 35 34 33	* * * * * * * * * * * * * * * * * * *
Romania Bulgaria Macedonia, Republic of Italy Saudi Arabia Indonesia Morocco	36 36 35 35 34 33	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## A shop increased its prices by 20%

A shop increased its prices by 20%. What is the new price of an item which previously sold for 800 zeds?

- $\bigcirc$  640 zeds
- $\bigcirc$  900 zeds
- (C) 960 zeds
- $\bigcirc$  1,000 zeds

Item Number: M032228

**Correct Response:** 

0

## **Overall Percent Correct**

Singapore	87	<b>A</b>
Hong Kong, SAR	86	<b>A</b>
Netherlands	79	<b>A</b>
Chinese Taipei	74	<b>A</b>
Korea, Republic of	74	<b>A</b>
Slovak Republic	73	<b>A</b>
Hungary	72	<b>A</b>
Belgium (Flemish)	72	<b>A</b>
Sweden	70	<b>A</b>
Estonia	65	
Japan	63	<b>A</b>
Scotland	62	<b>A</b>
Malaysia	62	<b>A</b>
Russian Federation	61	<b>A</b>
Lithuania	58	<b>A</b>
Israel	58	<b>A</b>
United States	57	<b>A</b>
Australia	55	<b>A</b>
Slovenia	55	<b>A</b>
Romania	54	0
Latvia	54	0
England	52	0
Serbia and Montenegro	51	0
International average	49	
International average		
New Zealand	49	0
New Zealand Italy	49 49	0
New Zealand Italy Norway	49 49 48	0
New Zealand Italy Norway Bulgaria	49 49 48 47	0 0
New Zealand Italy Norway Bulgaria Armenia	49 49 48 47 45	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus	49 49 48 47 45 45	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of	49 49 48 47 45 45	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile	49 49 48 47 45 45 44 41	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia	49 49 48 47 45 45 44 41 40	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of	49 49 48 47 45 45 44 41 40 39	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia	49 49 48 47 45 45 44 41 40 39 34	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana	49 49 48 47 45 45 44 41 40 39 34	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines	49 49 48 47 45 45 44 41 40 39 34 32 31	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana	49 49 48 47 45 45 44 41 40 39 34	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco	49 48 47 45 45 44 41 40 39 34 32 31 31 30	0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon	49 49 48 47 45 45 44 41 40 39 34 32 31 31 30 29	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain	49 49 48 47 45 45 44 41 40 39 34 32 31 31 30	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth. Jordan	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26 25	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth.	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth. Jordan Iran, Islamic Republic of	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26 25 24	0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth. Jordan Iran, Islamic Republic of Saudi Arabia	49 49 48 47 45 44 41 40 39 34 32 31 30 29 27 26 25 24 22	0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## A machine uses 2.4 liters of gasoline

A machine uses 2.4 liters of gasoline for every 30 hours of operation. How many liters of gasoline will the machine use in 100 hours?

- A 7.2
- B 8.0
- © 8.4
- D 9.6

Item Number: M032533

**Correct Response:** 

В

## **Overall Percent Correct**

Singapore	89	
Netherlands	78	
Hong Kong, SAR	77	
Korea, Republic of	75	
Belgium (Flemish)	74	
Chinese Taipei	71	
Malaysia	68	
Japan	66	
Estonia	65	
Lithuania	64	<b>A</b>
Slovak Republic	63	_
Hungary	63	<u> </u>
Sweden	60	<u> </u>
Lebanon	55	<u> </u>
United States	55	<u> </u>
Russian Federation	54	<u> </u>
Israel	53	
England	50	0
Scotland	50	0
Latvia	50	0
Slovenia	50	0
Australia	49	0
Romania	48	0
NUHallia	40	U
	47	
International average	<b>47</b>	
International average Serbia and Montenegro	45	0
International average Serbia and Montenegro Italy	45 44	0
International average Serbia and Montenegro Italy Norway	45 44 44	O O O
International average Serbia and Montenegro Italy Norway Moldova, Republic of	45 44 44 44	0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus	45 44 44 44 44	0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria	45 44 44 44 44 43	0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand	45 44 44 44 44 43 42	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia	45 44 44 44 43 42 41	0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan	45 44 44 44 43 42 41 40	0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of	45 44 44 44 43 42 41 40 38	0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt	45 44 44 44 43 42 41 40 38 34	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of	45 44 44 44 43 42 41 40 38 34 31	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia	45 44 44 44 43 42 41 40 38 34 31	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth.	45 44 44 44 43 42 41 40 38 34 31 31	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia	45 44 44 44 43 42 41 40 38 34 31 31 31	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29	0 0 0 0 0 0 0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27	0 0 0 0 0 0 0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27 27	0 0 0 0 0 0 0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco Botswana	45 44 44 44 43 42 41 40 38 34 31 31 30 29 27 27 27	0 0 0 0 0 0 0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco Botswana Bahrain	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27 27 23 23	0 0 0 0 0 0
International average Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco Botswana	45 44 44 44 43 42 41 40 38 34 31 31 30 29 27 27 27	0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Higher Not different Lower

Ghana

17

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## Three brothers receive 45,000 zeds

Three brothers, Bob, Dan, and Mark, receive a gift of 45,000 zeds from their father. The money is shared between the brothers in proportion to the number of children each one has. Bob has 2 children, Dan has 3 children, and Mark has 4 children.

How many zeds does Mark get?

- (A) 5,000
- (B) 10,000
- (c) 15,000
- D 20,000

Item Number: M032727

**Correct Response:** 

D

### **Overall Percent Correct**

Singapore	85	
Hong Kong, SAR	73	_
Korea, Republic of	71	<u> </u>
Chinese Taipei	68	_
Sweden	67	<u> </u>
Hungary	67	<u> </u>
Estonia	67	<u> </u>
Netherlands	66	<u> </u>
Slovak Republic	65	<u> </u>
Belgium (Flemish)	63	<u> </u>
Japan	60	<b>A</b>
Malaysia	57	
England	55	<b>A</b>
Australia	55	<b>A</b>
	53	
Romania		<b>A</b>
Israel	52	<b>A</b>
Russian Federation	52	
New Zealand	50	0
Lithuania	49	0
Italy	48	0
Scotland	48	0
Serbia and Montenegro	48	0
United States	45	0
Norway	45	0
Cl !-		$\sim$
Slovenia	45	0
International average	45	
International average Cyprus	<b>45</b> 42	0
International average Cyprus Chile	<b>45</b> 42 41	0
International average Cyprus Chile Moldova, Republic of	<b>45</b> 42 41 40	0 0
International average Cyprus Chile Moldova, Republic of Latvia	45 42 41 40 37	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria	45 42 41 40 37 37	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of	45 42 41 40 37 37 36	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of	45 42 41 40 37 37 36 35	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa	45 42 41 40 37 37 36 35	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana	45 42 41 40 37 37 36 35 32 32	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines	45 42 41 40 37 37 36 35 32 32 29	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana	45 42 41 40 37 36 35 32 32 29 29	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia	45 42 41 40 37 36 35 32 32 29 29 28	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan	45 42 41 40 37 36 35 32 32 29 29	0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia	45 42 41 40 37 36 35 32 32 29 29 28	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth.	45 42 41 40 37 37 36 35 32 29 29 28 28	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia	45 42 41 40 37 36 35 32 32 29 29 28 28 27	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon	45 42 41 40 37 36 35 32 32 29 29 28 28 27 26	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22 21	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22 21	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana Bahrain	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22 21 21	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana Bahrain Egypt	45 42 41 40 37 36 35 32 29 29 28 27 26 24 22 21 21 20	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Using Concepts

## 3/25 of the people in the audience were children

At a play,  $\frac{3}{25}$  of the people in the audience were children.

What percent of the audience was this?

- A 12%
- (B) 3%
- (c) 0.3%
- (D) 0.12%

Item Number: M032570

Correct Response:

## **Overall Percent Correct**

Singapore	96	
Hong Kong, SAR	90	
Belgium (Flemish)	87	
Malaysia	84	
Netherlands	79	
Chinese Taipei	77	
Korea, Republic of	76	
England	71	
United States	70	
Botswana	70	
New Zealand	67	
Australia	67	
Latvia	65	
Cyprus	64	
Scotland	63	
Israel	63	
Slovenia	61	
Sweden	61	
Japan	60	
Lithuania	59	0
Estonia	57	0
Slovak Republic	56	0
Hungary	55	0
	55	U
International average	55	
International average Russian Federation	<b>55</b> 52	0
International average Russian Federation Indonesia	<b>55</b> 52 51	0
International average Russian Federation Indonesia Bulgaria	55 52 51 50	0 0
International average Russian Federation Indonesia Bulgaria Norway	55 52 51 50 50	0 0 0
International average Russian Federation Indonesia Bulgaria Norway Romania	55 52 51 50 50 49	0 0 0 <b>V</b>
International average Russian Federation Indonesia Bulgaria Norway Romania Italy	55 52 51 50 50 49 47	○ ○ ○ ▼ ▼
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro	55 52 51 50 50 49 47 45	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt	55 52 51 50 50 49 47 45 44	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia	55 52 51 50 50 49 47 45 44 42	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of	55 52 51 50 50 49 47 45 44 42 42	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines	55 52 51 50 50 49 47 45 44 42 42 42	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of	55 52 51 50 50 49 47 45 44 42 42 42 42	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana	55 52 51 50 50 49 47 45 44 42 42 42 42 41	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of	55 52 51 50 50 49 47 45 44 42 42 42 41 39	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of Palestinian Nat'l Auth.	55 52 51 50 50 49 47 45 44 42 42 42 41 39 39	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of Palestinian Nat'l Auth. Jordan	55 52 51 50 50 49 47 45 44 42 42 42 41 39 39	0 0 0 V V V V V V V V V V V V V V V V V
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of Palestinian Nat'l Auth. Jordan Chile	55 52 51 50 50 49 47 45 44 42 42 42 41 39 39 39	0 0 0 V V V V V V V V V V V V V V V V V
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of Palestinian Nat'l Auth. Jordan Chile Bahrain	55 52 51 50 50 49 47 45 44 42 42 42 41 39 39 39 39 36	0 0 0 0 V
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of Palestinian Nat'l Auth. Jordan Chile Bahrain Lebanon	55 52 51 50 50 49 47 45 44 42 42 42 41 39 39 39 39 36 34	0 0 0 •
International average Russian Federation Indonesia Bulgaria Norway Romania Italy Serbia and Montenegro Egypt Armenia Macedonia, Republic of Philippines Moldova, Republic of Ghana Iran, Islamic Republic of Palestinian Nat'l Auth. Jordan Chile Bahrain	55 52 51 50 50 49 47 45 44 42 42 42 41 39 39 39 39 36	0 0 0 0 V

Country average vs. International average:

29

Morocco

Saudi Arabia

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

## The closest to 11 squared plus 9 squared

Which of these is closest to  $11^2 + 9^2$ ?

- $\bigcirc$  20 + 20
- B 20 + 80
- $\bigcirc$  120 + 20
- (D) 120 + 80

Item Number: M032609

**Correct Response:** 

П

## **Overall Percent Correct**

Hong Kong, SAR	88	<b>A</b>
Latvia	88	
Hungary	85	<b>A</b>
Russian Federation	84	<b>A</b>
United States	82	<b>A</b>
Slovak Republic	82	<b>A</b>
Estonia	81	<b>A</b>
Slovenia	81	<b>A</b>
Lebanon	80	<b>A</b>
Belgium (Flemish)	80	<b>A</b>
Korea, Republic of	80	<b>A</b>
Malaysia	80	<b>A</b>
Chinese Taipei	80	<b>A</b>
Romania	80	<b>A</b>
Singapore	80	<b>A</b>
Serbia and Montenegro	79	<b>A</b>
Italy	79	<b>A</b>
Lithuania	77	
Cyprus	74	
Australia	73	<b>A</b>
Netherlands	69	<b>A</b>
Macedonia, Republic of	68	
Bulgaria	67	
	<b>C</b> F	0
Indonesia	65	U
Indonesia England	65 64	0
England Armenia Israel	64 64 63	0
England Armenia Israel International average	64 64 63 <b>61</b>	0 0 0
England Armenia Israel International average Scotland	64 64 63 <b>61</b> 59	0 0 0
England Armenia Israel International average Scotland New Zealand	64 64 63 <b>61</b> 59 56	0 0 0
England Armenia Israel International average Scotland	64 64 63 <b>61</b> 59 56 53	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan	64 64 63 <b>61</b> 59 56 53 50	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan	64 64 63 <b>61</b> 59 56 53 50 49	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth.	64 64 63 <b>61</b> 59 56 53 50 49	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco	64 64 63 <b>61</b> 59 56 53 50 49 48 47	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 44	0 0 0
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 44 41 37	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 44 41 37 36	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 41 37 36 28	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 41 37 36 28 26	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia South Africa	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia South Africa Moldova, Republic of	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22 20 18	0 0 0 0 •
England Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia South Africa	64 64 63 <b>61</b> 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22	0 0 0 0 V

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

## Which equals 370 times 998 plus 370 times 2

Which of these is equal to  $370 \times 998 + 370 \times 2$ ?

- (A)  $370 \times 1,000$
- (B)  $372 \times 998$
- $\bigcirc$  740 × 998
- $\bigcirc$  370  $\times$  998  $\times$  2

Item Number: M032690

**Correct Response:** 

Α

## **Overall Percent Correct**

Singapore	70	<b>A</b>
Hong Kong, SAR	69	_
Chinese Taipei	68	<u> </u>
Hungary	61	_ _
Netherlands	59	<u> </u>
Estonia	57	<u> </u>
Lebanon	53	
	53 52	<b>A</b>
Israel		<b>A</b>
Egypt	52	
Belgium (Flemish)	50	<b>A</b>
Russian Federation	49	
Australia	49	
United States	48	
Lithuania	47	
Malaysia	47	
New Zealand	46	
Korea, Republic of	43	O
Romania	43	0
Botswana	41	0
Scotland	40	0
International average	39	
Armenia	38	0
Latvia	38	0
Slovak Republic	38	0
	37	0
Japan	37 37	0
Japan Bulgaria	37	0
Japan Bulgaria Moldova, Republic of	37 37	0
Japan Bulgaria Moldova, Republic of Slovenia	37 37 36	0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy	37 37 36 35	0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of	37 37 36 35 34	0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England	37 37 36 35 34 34	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth.	37 37 36 35 34 34 33	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia	37 37 36 35 34 34 33 31	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines	37 37 36 35 34 34 33 31	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia	37 37 36 35 34 34 33 31	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines	37 37 36 35 34 34 33 31	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain	37 37 36 35 34 34 33 31 30 28	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus	37 37 36 35 34 34 33 31 30 28 24	0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden	37 37 36 35 34 34 33 31 30 28 24 23	0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro	37 37 36 35 34 34 33 31 30 28 24 23 23	0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway	37 37 36 35 34 34 33 31 30 28 24 23 23 22	0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia	37 37 36 35 34 34 33 31 30 28 24 23 23 22 22	0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco	37 37 36 35 34 34 33 31 30 28 24 23 22 22 21 21	0 0 0 0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco South Africa Chile	37 37 36 35 34 34 33 31 30 28 24 23 22 21 21 18	0 0 0 0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco South Africa Chile Indonesia	37 37 36 35 34 34 33 31 30 28 24 23 22 21 21 18 18	0 0 0 0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco South Africa Chile Indonesia Jordan	37 37 36 35 34 34 33 31 30 28 24 23 22 21 21 18 18	0 0 0 0 0 0 0 0 0
Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco South Africa Chile Indonesia	37 37 36 35 34 34 33 31 30 28 24 23 22 21 21 18 18	0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## Arrangements of 4-digit whole numbers

9 1 5

The four digits above are to be arranged from largest to smallest to form a four-digit number. The same four digits are then to be arranged from smallest to largest to form another four-digit number. What is the difference between the two resulting four-digit numbers?

- (A) 3,726
- (B) 4,726
- © 8,082
- (D) 8,182
- (E) 8,192

Item Number: M012028

**Correct Response:** 

### **Overall Percent Correct**

Korea, Republic of	92	<b>A</b>
Singapore	88	<b>A</b>
Chinese Taipei	87	<b>A</b>
Hong Kong, SAR	86	
Japan	85	<b>A</b>
Malaysia	79	
Latvia	77	
Slovenia	75	<b>A</b>
Belgium (Flemish)	75	<b>A</b>
Sweden	72	
Bulgaria	71	<b>A</b>
Italy	71	
Russian Federation	70	<b>A</b>
Romania	70	<b>A</b>
United States	70	<b>A</b>
Serbia and Montenegro	70	<b>A</b>
Slovak Republic	69	<b>A</b>
Estonia	68	<b>A</b>
Australia	68	<b>A</b>
Moldova, Republic of	67	<b>A</b>
Scotland	66	<b>A</b>
Israel	66	<b>A</b>
Hungary	65	<b>A</b>
Lithuania	65	
	65 64	<b>A</b>
Lithuania Macedonia, Republic of Netherlands		
Macedonia, Republic of	64	<b>A</b>
Macedonia, Republic of Netherlands	64 61	0
Macedonia, Republic of Netherlands England	64 61 60	0
Macedonia, Republic of Netherlands England International average	64 61 60 <b>59</b>	0 0
Macedonia, Republic of Netherlands England International average Armenia	64 61 60 <b>59</b> 57 56 56	• O O O
Macedonia, Republic of Netherlands England International average Armenia New Zealand	64 61 60 <b>59</b> 57 56	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of	64 61 60 <b>59</b> 57 56 56	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus	64 61 60 <b>59</b> 57 56 56 55	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt	64 61 60 <b>59</b> 57 56 56 55 53	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan	64 61 60 <b>59</b> 57 56 56 55 53 52 50	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li>&lt;</ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth.	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50 45 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li>&lt;</ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50 45 41 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li>&lt;</ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50 45 41 41 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li>&lt;</ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50 45 41 41 41 40	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41 40 35	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines Botswana	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41 40 35 32	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines Botswana Morocco	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41 40 35 32 30	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines Botswana Morocco Ghana	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41 40 35 32 30 22	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li><li>T</li>&lt;</ul>

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## Approximate number of magazines sold

About 7,000 copies of a magazine are sold each week. Approximately how many magazines are sold each year?

(A) 8,400

B 35,000

© 84,000

D 350,000

**(E)** 3,500,000

Item Number: M022194

**Correct Response:** 

D

## Overall Percent Correct

Korea, Republic of	74	
Singapore	74	<b>A</b>
Chinese Taipei	71	
Netherlands	69	<b>A</b>
Belgium (Flemish)	69	<u> </u>
Hong Kong, SAR	68	<u> </u>
Australia	67	<u> </u>
Hungary	66	<u> </u>
Japan	66	<u> </u>
Sweden	63	<u> </u>
New Zealand	62	<u> </u>
Estonia	62	
	61	
England Slovenia	60	
		<b>A</b>
Slovak Republic	59	<b>A</b>
United States	58	<u> </u>
Malaysia	58	<u> </u>
Russian Federation	58	<b>A</b>
Scotland	58	<b>A</b>
Norway	58	<b>A</b>
Lithuania	57	<b>A</b>
Latvia	57	<b>A</b>
Bulgaria	56	
Israel	54	
Italy	53	
Serbia and Montenegro	50	0
Serbia and Montenegro International average	50 <b>49</b>	0
Serbia and Montenegro International average Romania	50 <b>49</b> 47	0
Serbia and Montenegro International average Romania Cyprus	50 49 47 47	0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of	50 49 47 47 44	0 0 0
Serbia and Montenegro International average Romania Cyprus	50 <b>49</b> 47 47	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of	50 49 47 47 44	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of	50 49 47 47 44 42	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia	50 49 47 47 44 42 39	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia	50 49 47 47 44 42 39 38	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia	50 49 47 47 44 42 39 38 37	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines	50 49 47 47 44 42 39 38 37 36	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon	50 49 47 47 44 42 39 38 37 36 36	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile	50 49 47 47 44 42 39 38 37 36 36 36	0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco	50 49 47 47 44 42 39 38 37 36 36 36 33	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain	50 49 47 47 44 42 39 38 37 36 36 36 33 31	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt	50 49 47 47 44 42 39 38 37 36 36 33 31 29 28 23	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 23	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia Palestinian Nat'l Auth.	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 23 21	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia Palestinian Nat'l Auth. South Africa	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 21 20	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia Palestinian Nat'l Auth. South Africa Botswana	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 21 20 19	0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## The teachers plan to send 6 newsletters per year

The teachers at Parkway School plan to send 6 newsletters per year to each of the 620 families with children at the school. The newsletters each need 2 sheets of paper. The paper is sold in packs of 500 sheets.
What is the least number of packs of paper needed to print the school newsletter for the year?
Answer:

#### Item Number: M032652

### **SCORING**

### **Correct Response**

• 15

### **Incorrect Response**

- 14 or 14.88
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Armenia Netherlands Singapore Hong Kong, SAR Belgium (Flemish) Japan Chinese Taipei Korea, Republic of United States Hungary	60 57 57 53 46 44 44 43 36 35	
Slovak Republic Scotland Estonia Sweden New Zealand	33 32 32 30 29	<b>A A A A</b>
Russian Federation Lithuania Australia England	29 29 28 27	<b>▲ ▲ ○</b>
Slovenia Latvia International average	24 22 <b>21</b>	0
Italy Bulgaria Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain Egypt Palestinian Nat'l Auth. Morocco Botswana Ghana Saudi Arabia	21 20 20 20 18 14 13 11 10 8 8 4 4 3 3 3 3 3 2 1 0 0	

## Country average vs. International average:

Higher	
Not different	C
Lower	_

### The teachers plan to send 6 newsletters per year (continued)

Item Number: M032652

## **Student Responses**

### **Correct Response:**

The teachers at Parkway School plan to send 6 newsletters per year to each of the 620 families with children at the school. The newsletters each need 2 sheets of paper. The paper is sold in packs of 500 sheets.

What is the least number of packs of paper needed to print the school newsletter for the year?

Answer: 15

500 77440

### **Incorrect Response:**

The teachers at Parkway School plan to send 6 newsletters per year to each of the 620 families with children at the school. The newsletters each need 2 sheets of paper. The paper is sold in packs of 500 sheets.

What is the least number of packs of paper needed to print the school newsletter for the year?

Answer: 3 polle of 500

X 20

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## Garden with 14 rows of 20 plants each

A garden has 14 rows. Each row has 20 plants. The gardener then plants 6 more rows with 20 plants in each row.
How many plants are now there altogether?
<b>A</b>
Answer:
to an November 14000074

#### Item Number: M032671

### **SCORING**

### **Correct Response**

• 400 or equivalent.

### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Singapore	91	
Netherlands	88	
Hong Kong, SAR	87	
Belgium (Flemish)	86	
Korea, Republic of	85	
Estonia	85	
Chinese Taipei	83	
Sweden	82	
Malaysia	81	
United States	78	
Latvia	78	
Russian Federation	78	
New Zealand	77	
Australia	76	
England	75	
Hungary	72	
Israel	72	
Lithuania	72	
Scotland	71	
Italy	71	
Slovenia	67	
Moldova, Republic of	66	
Cyprus	66	
Romania	65	_
Bulgaria	63	O
Bulgaria Slovak Republic	63	0
Slovak Republic Japan	63 61	0
Slovak Republic Japan Chile	63 61 61	0 0
Slovak Republic Japan Chile Serbia and Montenegro	63 61 61 61	0
Slovak Republic Japan Chile Serbia and Montenegro International average	63 61 61 61	0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway	63 61 61 61 <b>61</b>	0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of	63 61 61 61 <b>61</b> 60 56	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia	63 61 61 61 <b>61</b> 60 56 49	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia	63 61 61 61 <b>61</b> 60 56 49	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia	63 61 61 61 <b>61</b> 60 56 49 48	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of	63 61 61 61 60 56 49 48 47	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon	63 61 61 61 60 56 49 48 47 44 43	0 0 0 0
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Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain	63 61 61 61 60 56 49 48 47 44 43 43	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco	63 61 61 61 60 56 49 48 47 44 43 43 41 39	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt	63 61 61 61 60 56 49 48 47 44 43 43 41 39 36	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines	63 61 61 61 60 56 49 48 47 44 43 43 41 39 36 35	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth.	63 61 61 61 60 56 49 48 47 44 43 43 41 39 36 35 33	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana	63 61 61 61 60 56 49 48 47 44 43 43 41 39 36 35 33 28	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana Saudi Arabia	63 61 61 61 60 56 49 48 47 44 43 43 41 39 36 35 33 28 23	0 0 0 0
Slovak Republic Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana Saudi Arabia South Africa	63 61 61 61 60 56 49 48 47 44 43 43 41 39 36 35 33 28 23 18	0 0 0 0
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Country average vs. International average:

## Garden with 14 rows of 20 plants each (continued)

Item Number: M032671

## **Student Responses**

### **Correct Response:**

A garden has 14 rows. Each row has 20 plants. The gardener then plants 6 more rows with 20 plants in each row.

How many plants are now there altogether?

Answer: \_\_\_\_400

## **Incorrect Response:**

A garden has 14 rows. Each row has 20 plants. The gardener then plants 6 more rows with 20 plants in each row.

How many plants are now there altogether?

Answer: 40

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