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 9

Item Number: M012042

Correct Response:

E

Overall Percent Correct

Hong Kong, SAR	84	
Korea, Republic of	84	
Chinese Taipei	83	
Singapore	80	
Estonia	77	
Japan	74	A
Russian Federation	73	<u> </u>
Hungary	69	<u> </u>
Israel	67	<u> </u>
Serbia and Montenegro	65	
United States	65	A
Belgium (Flemish)	63	A
Armenia	62	A
Latvia	61	A
Lithuania	60	
Slovak Republic	58	A
Bulgaria	57	
Moldova, Republic of	54	<u> </u>
Netherlands	54	_
Romania	51	0
Slovenia	51	0
Lebanon	49	0
		U
International average	48	
Malaysia	48	0
		_
Macedonia, Republic of	47	Ο
Iran, Islamic Republic of	44	0
		O ▼
Iran, Islamic Republic of	44	○▼
Iran, Islamic Republic of Philippines	44 44	○▼▼
Iran, Islamic Republic of Philippines Indonesia	44 44 43	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan	44 44 43 41	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain	44 44 43 41 40	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia	44 44 43 41 40 38 37	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt	44 44 43 41 40 38 37 37	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England	44 44 43 41 40 38 37 37	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy	44 44 43 41 40 38 37 37 37	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand	44 44 43 41 40 38 37 37 37 37 35	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana	44 44 43 41 40 38 37 37 37 37 35 30	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden	44 44 43 41 40 38 37 37 37 37 35 30 28	○▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia	44 44 43 41 40 38 37 37 37 37 35 30 28 26	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth.	44 44 43 41 40 38 37 37 37 37 35 30 28 26 25	○▼▼
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia	44 44 43 41 40 38 37 37 37 37 35 30 28 26 25 24	
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth.	44 44 43 41 40 38 37 37 37 37 35 30 28 26 25	
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco	44 44 43 41 40 38 37 37 37 37 35 30 28 26 25 24	
Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland	44 44 43 41 40 38 37 37 37 37 35 30 28 26 25 24 24	
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	44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	○▼▼
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 Chile	44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24 16 15	

Country average vs. International average: **▲** ○ ▼ Higher

Not different Lower

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	A
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	▼
Philippines	49 49	▼ ▼ ▼
Philippines United States	49 49 49	▼ ▼ ▼
Philippines United States Italy	49 49 49 48	* * * * * *
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 48 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 48 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

▲ ○ ▼

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:

0

Overall Percent Correct

Korea, Republic of	82	
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	Ο
Slovenia	55	0
Netherlands	54	0
Lithuania	53	0
Italy	53	0
Iran, Islamic Republic of	52	0
Malaysia	51	0
International average	49	
Scotland	48	0
Scotland United States	48 47	0
United States Moldova, Republic of	47 46	0
United States Moldova, Republic of Sweden	47 46 45	0 0
United States Moldova, Republic of	47 46 45 45	0 0 0
United States Moldova, Republic of Sweden Egypt Australia	47 46 45 45 45	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of	47 46 45 45 45 41	0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway	47 46 45 45 45 41 41	0 0 0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia	47 46 45 45 45 41 41	0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan	47 46 45 45 45 41 41 41 38	0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines	47 46 45 45 45 41 41 41 38 36	0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus	47 46 45 45 45 41 41 41 38 36 35	0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth.	47 46 45 45 45 41 41 41 38 36 35 33	0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England	47 46 45 45 45 41 41 41 38 36 35 33	0 0 0 0 0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand	47 46 45 45 41 41 41 38 36 35 33 33	0 0 0 0 0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco	47 46 45 45 41 41 41 38 36 35 33 33 33	0 0 0 0 0 0 0 0 0
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	47 46 45 45 41 41 41 38 36 35 33 33 33 32 27	0 0 0 0 0 0 0 0 0
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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25	0 0 0 0 0 0 0 0 0
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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25	0 0 0 0 0 0 0 0 0
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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24	0 0 0 0 0
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 South Africa	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 24 23	0 0 0 0 0 0 0 0 0
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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24	0 0 0 0 0 0 0 0 0

Country average vs. International average:

22

Indonesia

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	A
Serbia and Montenegro	34	A
Armenia	33	
Moldova, Republic of	31	
Bulgaria	30	
Slovak Republic	28	
Belgium (Flemish)	28	
Lithuania	26	
Lebanon	25	O
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	*
England	15	▼
New Zealand	14	*
Slovenia	13	*
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:

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	0
Australia Botswana South Africa	20 20 19	0
Australia Botswana South Africa Saudi Arabia	20 20 19 19	0
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	0
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	0
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	0
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	0
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	Ο
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	20 20 19 19 19 18 18 16 16 16 15 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 Slovenia Lebanon	20 20 19 19 19 18 18 16 16 16 15 15 15 12	· · · · · · · · · · · · · · · · · · ·
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	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12	· · · · · · · · · · · · · · · · · · ·
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	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 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	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	0
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:

_

Overall Percent Correct

Singapore	66	
Chinese Taipei	59	
Korea, Republic of	55	
Hong Kong, SAR	53	
Israel	41	
Hungary	41	_ _
Slovak Republic	38	<u> </u>
Russian Federation	36	<u> </u>
Japan	35	<u> </u>
Romania	35	<u> </u>
Netherlands	35	<u> </u>
Estonia	34	
Cyprus	34	
Belgium (Flemish)	33	
Italy	33	0
Latvia	32	0
Latvia Lithuania	32 32	0
New Zealand		
	31	0
Serbia and Montenegro	31	0
Slovenia	31	0
International average	29	
Moldova, Republic of	29	0
Australia	28	O
Bulgaria	28	0
Sweden	28	O
Armenia	26	0
United States	26	\blacksquare
England	25	
•		
Malaysia	25	
	25 25	*
Malaysia		▼ ▼ ▼
Malaysia Scotland	25	*
Malaysia Scotland Tunisia	25 24	* * * * * * * * * * * * * * * * * * *
Malaysia Scotland Tunisia Norway	25 24 23	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of	25 24 23 23	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco	25 24 23 23 22	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of	25 24 23 23 22 22	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt	25 24 23 23 22 22 21	*
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan	25 24 23 23 22 22 21 20	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth.	25 24 23 23 22 22 21 20 20	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon	25 24 23 23 22 22 21 20 20	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines	25 24 23 23 22 22 21 20 20 20 19	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain	25 24 23 23 22 22 21 20 20 20 19 18	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia	25 24 23 22 22 21 20 20 20 19 18 18	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia	25 24 23 23 22 21 20 20 20 19 18 18 18 15	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia Botswana	25 24 23 23 22 22 21 20 20 20 19 18 18 18 15	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia	25 24 23 23 22 21 20 20 20 19 18 18 18 15	▼
Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia Botswana	25 24 23 23 22 22 21 20 20 20 19 18 18 18 15	▼

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	A
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	O
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	▼
Macedonia, Republic of	39	•
Indonesia	39	•
Tunisia	36	•
Cyprus	36	▼ ▼
Egypt	35	
Jordan	34	•
Chile	31	▼
Bahrain	30	•
Palestinian Nat'l Auth.	30	▼
Botswana	29	▼
Morocco	28	▼
Ghana	28	▼
South Africa	23	V
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)
- © 36
- D 63

Item Number: M012040

Correct Response:

D

Overall Percent Correct

Singapore	93	A
Korea, Republic of	89	
Hong Kong, SAR	88	
Belgium (Flemish)	86	
Netherlands	85	
Chinese Taipei	83	
Malaysia	83	
United States	80	
Hungary	79	
Japan	79	
Scotland	79	
Australia	76	
England	74	
Slovak Republic	74	
Israel	72	
Slovenia	72	
Estonia	71	
Lebanon	71	
Russian Federation	71	
Latvia	70	
New Zealand	68	O
Iran, Islamic Republic of	66	O
Sweden	66	O
Cyprus	65	O
Italy	65	0
International average	64	
Lithuania	64	O
Tunisia	64	0

Lithuania	64	0
Tunisia	64	0
Serbia and Montenegro	63	0
Moldova, Republic of	61	0
Romania	61	0
Bulgaria	59	\blacksquare
Norway	59	\blacksquare
Egypt	58	\blacksquare
Indonesia	58	▼
Armenia	54	\blacksquare
Morocco	54	\blacksquare
Jordan	53	\blacksquare
Palestinian Nat'l Auth.	52	\blacksquare
Philippines	52	\blacksquare
Macedonia, Republic of	50	•
Bahrain	44	\blacksquare
Chile	44	\blacksquare
Botswana	41	▼
Saudi Arabia	30	\blacksquare
Ghana	28	\blacksquare
South Africa	26	•

Country average vs. International average:

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	A
Korea, Republic of	86	A
Hong Kong, SAR	84	A
Chinese Taipei	82	A
Estonia	81	A
Russian Federation	79	A
Hungary	79	A
Japan	77	A
Belgium (Flemish)	76	A
Slovak Republic	75	A
Latvia	75	A
Serbia and Montenegro	73	A
Lithuania	73	A
Sweden	70	A
Lebanon	69	A
Romania	67	A
Armenia	66	A
Slovenia	66	A
Israel	64	A
Moldova, Republic of	63	A
Bulgaria	63	0
Tunisia	63	
United States	62	A
Macedonia, Republic of	60	0
Netherlands	59	0
International average	58	
International average Morocco	58 57	0
International average Morocco Italy	58 57 57	0
International average Morocco Italy England	58 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 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 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	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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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	
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Bulgaria 59	Bulgaria 59	Serbia and Montenegro	61	
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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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Iran, Islamic Republic of 18 ▼ Palestinian Nat'l Auth. 17 ▼ Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia	44 44 37 37 37 31 28 26	○▼▼▼▼
Iran, Islamic Republic of 18 ▼ Palestinian Nat'l Auth. 17 ▼ Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan	44 44 37 37 37 31 28 26 25	○▼▼▼▼
Iran, Islamic Republic of 18 ▼ Palestinian Nat'l Auth. 17 ▼ Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia	44 44 37 37 37 31 28 26 25	○▼▼▼▼
Iran, Islamic Republic of 18 ▼ Palestinian Nat'l Auth. 17 ▼ Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Iran, Islamic Republic of 18 Palestinian Nat'l Auth. 17 Morocco 16 Norway 11 Chile 9 Saudi Arabia 6 South Africa 5	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt	44 44 37 37 37 31 28 26 25 25 23	○▼▼▼▼
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Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Morocco 16 ▼ Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼ South Africa 5 ▼	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain	44 44 37 37 37 31 28 26 25 25 23 22 19	O V
Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼	Norway 11 ▼ Chile 9 ▼ Saudi Arabia 6 ▼ South Africa 5 ▼	England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of	44 44 37 37 37 31 28 26 25 25 23 22 19	O V
Chile 9 ▼ Saudi Arabia 6 ▼	Chile 9 ▼ Saudi Arabia 6 ▼ 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.	44 44 37 37 31 28 26 25 25 23 22 19 18	O V
Saudi Arabia 6	Saudi Arabia 6 ▼ 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	44 44 37 37 31 28 26 25 25 23 22 19 18 17	O V
	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
- © −2
- \bigcirc -3

Item Number: M032728

Correct Response:

A

Overall Percent Correct

Korea, Republic of	76	A
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	0
Hungary	47	O
Slovak Republic	46	O
New Zealand	45	O
Moldova, Republic of	45	Ο
Bulgaria	45	O
Russian Federation	44	O
Australia	44	O
Israel	44	O
Netherlands	43	O
Malaysia	43	O
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 V
Slovak Republic Moldova, Republic of	47 47 46 45	0 0 V
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria	47 47 46 45 44	0 0 V
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth.	47 47 46 45 44 43	0 0 V
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia	47 47 46 45 44 43 43	0 0 V
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 V
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 V
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 V
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 V
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile	47 47 46 45 44 43 43 39 38 38 38 37	0
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	0 0 V
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 V
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 V
Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia	47 46 45 44 43 43 39 38 38 38 37 36 33 31	0 0 V
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 V
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 V

Country average vs. International average:

0

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	A
Singapore	69	A
Korea, Republic of	69	A
Hong Kong, SAR	68	A
Estonia	61	A
Russian Federation	60	A
Hungary	58	A
Serbia and Montenegro	57	A
Japan	55	A
Romania	53	A
Latvia	53	A
Belgium (Flemish)	52	A
Lithuania	51	A
Slovak Republic	47	A
Bulgaria	46	A
Israel	44	A
Italy	44	0
Macedonia, Republic of	42	Ο
Moldova, Republic of	41	Ο
Indonesia	41	0
Armenia	41	0
International average	40	
Netherlands	40	0
ivenienanus	40	0
Sweden	38	0
		0
Sweden United States England	38 38 38	0 0
Sweden United States	38 38	0 0 0
Sweden United States England	38 38 38	0 0
Sweden United States England Lebanon	38 38 38 37	0 0 0
Sweden United States England Lebanon Slovenia	38 38 38 37 37	0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand	38 38 38 37 37	0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia	38 38 38 37 37 37 36	0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland	38 38 38 37 37 37 36 32	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia	38 38 37 37 37 36 32 30 30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines	38 38 37 37 37 36 32 30 30 30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of	38 38 37 37 37 36 32 30 30 27 27	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0
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
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 36 32 30 30 27 27 26 25 24 23 22	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan Norway Chile Palestinian Nat'l Auth.	38 38 38 37 37 37 36 32 30 30 27 27 26 25 24 23 22 22 21	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:

15

0

Higher Not different Lower

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	A
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	*
Scotland	20	*
Lithuania	19	*
England	18	*
Bahrain	16	*
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	*
Norway	3	▼ _
Chile	3	▼
Ghana	2	▼
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.

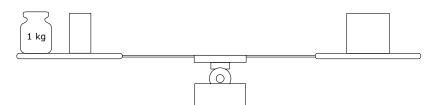
Equation 1: 7x + 4y = Z

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
- ① 3 kg

Item Number: M012002

Correct Response:

C

Overall Percent Correct

Estonia	86	A
Russian Federation	85	A
Netherlands	83	
Japan	82	A
Singapore	82	A
Hong Kong, SAR	81	A
Italy	79	A
Belgium (Flemish)	78	A
Korea, Republic of	78	A
Slovak Republic	78	A
Sweden	78	A
Latvia	77	
Australia	76	A
Chinese Taipei	76	A
England	76	A
Lithuania	76	A
Hungary	75	A
New Zealand	75	A
Malaysia	74	A
Scotland	74	A
United States	74	A
Bulgaria	73	A
Slovenia	73	A
Moldova, Republic of	68	A
Israel	67	A
Israel Norway	67 66	0
Norway Romania	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 63	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of	66 66 65 64 63	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of	66 66 65 64 63 63	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan	66 66 65 64 63 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 63 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	66 66 65 64 63 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 63 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 63 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 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. Bahrain	66 66 65 64 63 63 63 52 51 51 50 49 45 42	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 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 Indonesia	66 66 65 64 63 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 63 63 63 52 51 51 50 49 45 42 42 41 41	0 0 0 0 0 0 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 0 0 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 52 51 51 50 49 45 42 42 41 41 36 34	0 0 0 0 0 0 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 52 51 51 50 49 45 42 41 41 36 34 31	0 0 0 0 0 0 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 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 52 51 51 50 49 45 42 41 41 36 34 31	0 0 0 0 0 0 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?

Item Number: M032046

Correct Response:

Overall Percent Correct

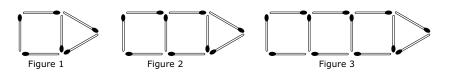
Singapore Hong Kong, SAR Korea, Republic of Chinese Taipei Japan Armenia Russian Federation Romania Serbia and Montenegro Moldova, Republic of Bulgaria Malaysia Belgium (Flemish) Indonesia Macedonia, Republic of Estonia United States	61 60 52 48 46 45 44 43 34 31 31 30 30 27 26	
International average	25	
Lebanon	24	0
Israel	24	0
Jordan	23	0
Philippines	22	▼
Egypt	21	▼
Lithuania	21	▼
Hungary	21	▼
Latvia	21	▼
Cyprus	20	* * * * *
Italy	20	▼
England	20	▼
Slovak Republic	19	▼
Australia	18	▼
Netherlands	17	▼
Tunisia	17	▼
Iran, Islamic Republic of	16	▼
Palestinian Nat'l Auth.	15	▼
Bahrain	15	▼
Slovenia	15	▼
New Zealand	14	* * * * *
Scotland	12	▼
Morocco	12	▼
Saudi Arabia	12	▼
Sweden	11	▼
Botswana	10	▼
South Africa	10	▼
Chile	9	▼
Norway	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	A
Singapore	73	A
Chinese Taipei	71	A
Japan	67	A
Hong Kong, SAR	66	A
Belgium (Flemish)	64	A
New Zealand	63	A
Australia	62	A
Scotland	61	A
Hungary	61	
Slovak Republic	60	
Netherlands	59	
Russian Federation	59	
Sweden	59	
Estonia	58	
Israel	58	A
Malaysia	57	A
United States	56	A
Slovenia	56	<u> </u>
Lithuania	56	<u> </u>
Moldova, Republic of	55	<u> </u>
Italy	54	<u> </u>
Bulgaria	53	0
England	52	0
Romania	51	0
		-
Serbia and Montenegro	51	0
Serbia and Montenegro Macedonia, Republic of	51 50	0
Serbia and Montenegro Macedonia, Republic of Latvia	51 50 49	0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus	51 50 49 49	0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average	51 50 49 49	0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia	51 50 49 49 48 47	0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway	51 50 49 49 48 47 46	0 0 0
Serbia and Montenegro Macedonia, Republic of Latvia Cyprus International average Armenia Norway Chile	51 50 49 49 48 47 46 43	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	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 37	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 34	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	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 32	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
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
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
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 29 29	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
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
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
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
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
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

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	A
Korea, Republic of	51	A
Singapore	50	A
Hungary	49	A
Japan	46	A
United States	45	A
Italy	45	A
Belgium (Flemish)	43	A
Slovenia	41	A
Australia	39	A
Hong Kong, SAR	39	A
Slovak Republic	39	A
Chinese Taipei	39	A
Bulgaria	38	A
Estonia	38	A
Netherlands	38	A
Scotland	37	A
Sweden	35	A
Malaysia	35	A
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 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 18	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:

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.





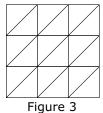


Figure 1

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?

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: 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	A
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	_
Cyprus	30	•
Bulgaria	30	\blacksquare
Macedonia, Republic of	25	\blacksquare
Chile	23	▼ ▼ ▼
Jordan	21	\blacksquare
Indonesia	20	\blacksquare
Palestinian Nat'l Auth.	17	•
Philippines	17	*
Morocco	16	\blacksquare
Bahrain	16	V
Iran, Islamic Republic of	15	\blacksquare
Egypt	15	\blacksquare
Lebanon	12	\blacksquare
Botswana	11	*
South Africa	6	\blacksquare
Tunisia	5	V
Saudi Arabia	4	\blacksquare
Ghana	3	\blacksquare

Country average vs. International average:

Higher	
Not different	0
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

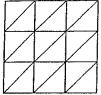


Figure 3

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

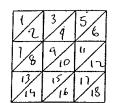


Figure 3

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?

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: 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	
Singapore	56	
Chinese Taipei	56	
Hong Kong, SAR	56	
Japan	55	
Armenia	42	
Netherlands	40	
Australia	33	
Scotland	31	
Hungary	30	
United States	30	A
New Zealand	29	
Belgium (Flemish)	28	
Sweden	26	
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	0
Moldova, Republic of	20	0
Israel	20	0
isidei	20	U
Lithuania	10	0
Lithuania	19	0
Romania	19	Ο
Romania Latvia	19 19	0
Romania Latvia Serbia and Montenegro	19 19 19	0 0 0
Romania Latvia Serbia and Montenegro Cyprus	19 19 19 17	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria	19 19 19 17 16	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia	19 19 19 17 16	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway	19 19 19 17 16 15	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan	19 19 19 17 16 15 14	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines	19 19 19 17 16 15 14 12	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth.	19 19 19 17 16 15 14 12 11	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines	19 19 19 17 16 15 14 12	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth.	19 19 19 17 16 15 14 12 11	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of	19 19 19 17 16 15 14 12 11	0
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	0 0 0
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 0 0 * * * * * * * * *
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	0 0 0 * * * * * * * * *
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 11 10 9 9 8 7	0 0 0 * * * * * * * * *
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 11 10 9 8 7	0 0 0 * * * * * * * * *
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	0 0 0 * * * * * * * * *
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 9 8 7 7 6 5	0 0 0 * * * * * * * * *
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 17 16 15 14 12 11 10 9 9 8 7 7 6 5 4	0 0 0 * * * * * * * * *
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 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

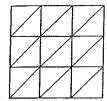


Figure 3

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

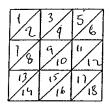


Figure 3

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	1

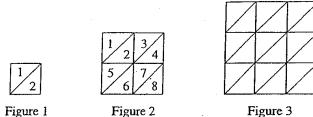
Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

Student Responses

Correct Response:

The three figures below are divided into small congruent triangles.

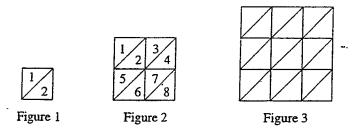


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

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

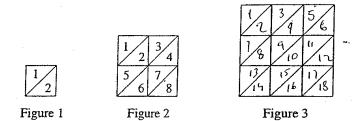
Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

Student Responses (continued)

Incorrect Response:

The three figures below are divided into small congruent triangles.

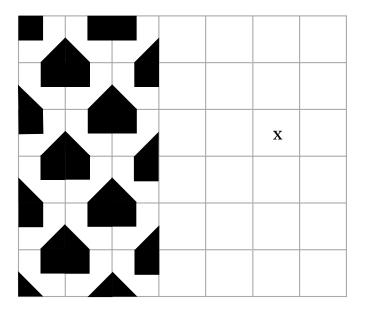


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

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	A
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	O
Israel	34	0
International average	32	

iliterilational avera	ige 32	
Bulgaria	30	0
Romania	29	0
Lithuania	27	0
Cyprus	24	\blacksquare
Chile	23	\blacksquare
Bahrain	22	\blacksquare
Serbia and Montene	gro 20	\blacksquare
Jordan	16	\blacksquare
Moldova, Republic o	f 15	O V
Philippines	14	\blacksquare
Iran, Islamic Republic	of 13	\blacksquare
Macedonia, Republic	of 13	\blacksquare
Indonesia	11	\blacksquare
Lebanon	10	* * * * * * * * * * * * * * * * * * *
South Africa	8	\blacksquare
Saudi Arabia	8	\blacksquare
Morocco	7	\blacksquare
Egypt	7	\blacksquare
Botswana	7	\blacksquare
Armenia	6	\blacksquare
Palestinian Nat'l Auth	n. 3	\blacksquare
Tunisia	2	\blacksquare

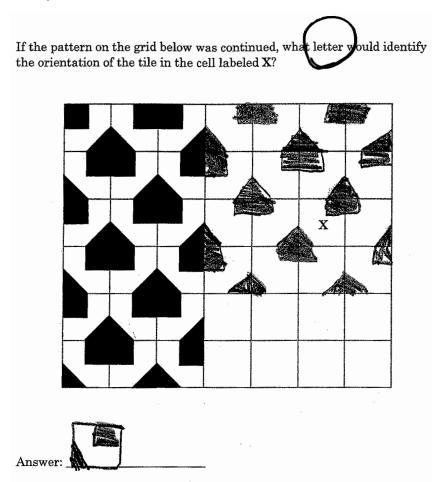
Country average vs. International average:

Geometry tiling: identify cell with letter (continued)

Item Number: M032744

Student Responses

Correct Response:



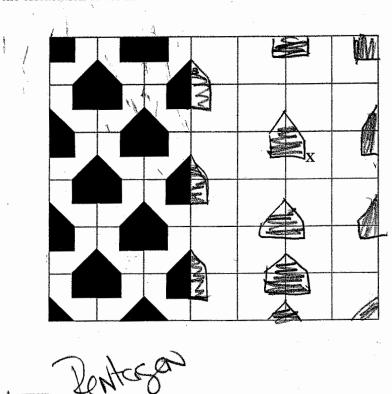
Geometry tiling: identify cell with letter (continued)

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

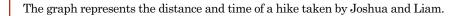
Overall Percent Correct

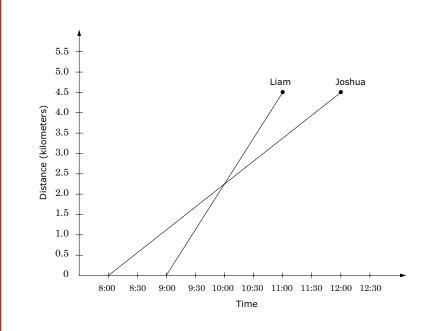
Korea, Republic of Japan Hungary Estonia Chinese Taipei Singapore Hong Kong, SAR Latvia Australia Russian Federation Scotland United States Netherlands New Zealand England Lithuania Belgium (Flemish) Serbia and Montenegro Israel Slovak Republic Bulgaria	85 76 75 74 71 71 71 70 69 68 68 67 64 64 62 58 57 56	
Slovenia	53	0
Italy	51	0
Malaysia	51	0
International average	50	
International average	50	V
Jordan Sweden	46 45	▼
Jordan	46	▼ ▼
Jordan Sweden	46 45	* * *
Jordan Sweden Macedonia, Republic of Romania Norway	46 45 42 42 40	* * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of	46 45 42 42 40 39	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain	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	46 45 42 42 40 39 38	* * * * * * * * * * * * * * * * * * *
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 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	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 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	* * * * * * * * * * * * * * * * * * *

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	A
Hong Kong, SAR	90	A
Korea, Republic of	89	A
Estonia	88	A
Singapore	87	A
Hungary	84	
Lithuania	84	A
Sweden	84	A
Russian Federation	81	A
Netherlands	81	A
Chinese Taipei	81	A
England	81	A
United States	80	A
Slovenia	79	A
Latvia	78	A
Italy	75	A
Australia	75	A
Belgium (Flemish)	73	A
Scotland	73	A
New Zealand	72	A
Israel	72	A
Slovak Republic	70	A
Serbia and Montenegro	68	A
Bulgaria	67	A
Norway	64	0
International average	62	
International average Cyprus	62 58	0
International average Cyprus Romania	62 58 58	0
International average Cyprus Romania Macedonia, Republic of	62 58 58 53	0
International average Cyprus Romania Macedonia, Republic of Malaysia	58 58 58 53	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan	58 58 53 53 52	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia	58 58 53 53 52 52	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile	58 58 53 53 52 52 51	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain	58 58 53 53 52 52 52 51	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt	58 58 53 53 52 52 51 50 47	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
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
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
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 52 52 51 50 47 47 46 42 41 39	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 52 52 51 50 47 47 46 42 41 39 37	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 52 52 51 50 47 47 46 42 41 39 37 31	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 53 52 52 51 50 47 46 42 41 39 37 31 26	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	58 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	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	58 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	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	58 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	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	58 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	0

Country average vs. International average: