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The Nation's Report Card
Mathematics 2007

TRIAL URBAN DISTRICT ASSESSMENT RESULTS AT GRADES 4 AND 8

CONTENTS

What is The Nation's Report Card™?

The Nation's Report Card™ informs the public about the academic achievement of elementary and secondary students in the United States. Report cards communicate the findings of the National Assessment of Educational Progress (NAEP), a continuing and nationally representative measure of achievement in various subjects over time.

For over three decades, NAEP assessments have been conducted periodically in reading, mathematics, science, writing, U.S. history, civics, geography, and other subjects. By collecting and reporting information on student performance at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement and relevant variables is collected. The privacy of individual students and their families is protected, and the identities of participating schools are not released.

NAEP is a congressionally authorized project of the National Center for Education Statistics (NCES) within the Institute of Education Sciences of the U.S. Department of Education. The Commissioner of Education Statistics is responsible for carrying out the NAEP project. The National Assessment Governing Board oversees and sets policy for NAEP.

Executive Summary

At both grades 4 and 8, most districts had higher percentages of students performing at or above *Basic* and *Proficient* in 2007 compared with 2003. In general, there was a reduction in percentages of students performing below *Basic* and an increase in percentages at or above *Basic*.

The results from the NAEP Trial Urban District Assessment (TUDA) make it possible to compare the performance of students in participating urban school districts to that of public school students in the nation, in large central cities (population over 250,000), and to each other.

About 38,000 fourth- and eighth-graders from 11 urban districts participated in the third TUDA in mathematics in 2007. Ten of the districts also have results for two previous assessments (2003 and 2005). Results for Austin are reported for one earlier assessment (2005).

Atlanta
Austin
Boston
Charlotte
Chicago
Cleveland
District of Columbia
Houston
Los Angeles
New York City
San Diego

At grade 4

- Eight districts showed increases compared with 2003, four districts had higher average scores compared with 2005, and one district had a lower average score in 2007 compared with 2005.
- All eight districts showing increases since 2003 also had higher percentages of students performing at or above *Basic* and at or above *Proficient*, and five had higher percentages of students at *Advanced*.

At grade 8

- Eight districts showed increases compared with 2003, and six districts had higher average scores than in 2005.
- Of the eight districts showing score increases since 2003, seven had higher percentages of students at or above *Basic*, six had higher percentages at or above *Proficient*, and four had higher percentages at *Advanced*.

Changes in NAEP mathematics scores

District	Grade 4		Grade 8	
	Since 2003	Since 2005	Since 2003	Since 2005
Atlanta	↑	↑	↑	↑
Austin	—	↔	—	↔
Boston	↑	↑	↑	↑
Charlotte	↔	↔	↑	↔
Chicago	↑	↔	↑	↔
Cleveland	↔	↓	↔	↑
District of Columbia	↑	↑	↑	↑
Houston	↑	↔	↑	↑
Los Angeles	↑	↔	↑	↑
New York City	↑	↑	↔	↔
San Diego	↑	↔	↑	↔

↑ Indicates the score was higher in 2007.
↓ Indicates the score was lower in 2007.
↔ Indicates there was no significant change in the score in 2007.
— District did not participate in 2003.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

CONTEXT FOR URBAN DISTRICT RESULTS

It is important to examine the results for each of the districts by race/ethnicity and family income status. There is generally a higher concentration of minority (races other than White) and lower-income families in these urban districts than in the nation as a whole.

For example, Black and Hispanic students made up about 38 percent of fourth-graders in the nation, but between 56 and 92 percent of the fourth-graders across the 11 districts. At grade 8, between 49 and 100 percent of students in each of the participating districts were eligible for the National School Lunch Program (an indicator of poverty) in 2007, compared to 41 percent of eighth-graders nationally.

In many cases, when scores for only Black, Hispanic, or lower-income students in the districts are compared with their peers nationally, students in the districts score comparably or higher. Additionally, over time these student groups are making gains.

For additional information, see the individual district profiles beginning on page 32 and visit http://nationsreportcard.gov.

GAINS MADE BY BLACK, HISPANIC, AND LOWER-INCOME STUDENTS

At grade 4, compared with 2003, scores were higher for

- White students in four districts, Black students in five districts, Hispanic students in six districts, lower-income students in eight districts, and
- all three racial/ethnic groups in two of the districts.

At grade 8, compared with 2003, scores were higher for

- White students in four districts, Black students in six districts, Hispanic students in four districts, lower-income students in eight districts, and
- all three racial/ethnic groups in two districts.

LOWER-INCOME STUDENTS IN MANY DISTRICTS OUTPERFORM PEERS IN NATION

When results for only lower-income students in 2007 were compared at grade 4

- five districts had higher average scores than the score for lower-income students in the nation, and
- six districts scored lower.

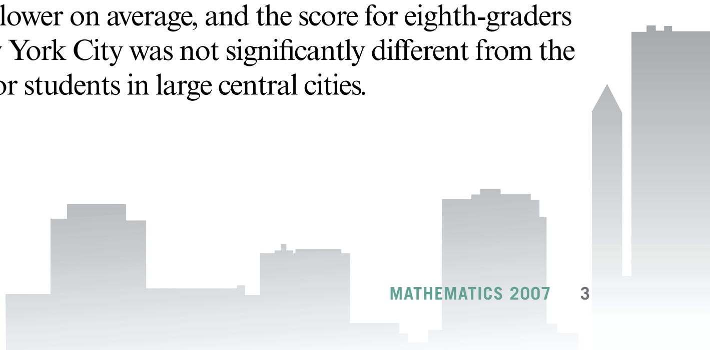
When only scores for lower-income students were compared at grade 8

- six districts had scores that were higher than or not significantly different from the score for lower-income students in the nation, and
- five districts scored lower.

HALF OF DISTRICTS PERFORM HIGHER THAN LARGE CENTRAL CITIES

In 2007, fourth-graders in Austin, Boston, Charlotte, Houston, New York City, and San Diego scored higher on average than students in large central cities. Scores for fourth-graders in the other five districts were lower than the score for students in large central cities.

Eighth-graders in Austin, Boston, Charlotte, Houston, and San Diego scored higher, on average, than students in large central cities. Students in Atlanta, Chicago, Cleveland, the District of Columbia, and Los Angeles scored lower on average, and the score for eighth-graders in New York City was not significantly different from the score for students in large central cities.



The Mathematics Trial Urban District Assessment

The NAEP Trial Urban District Assessment (TUDA) is designed to explore the feasibility of using NAEP to report on the performance of fourth- and eighth-grade public school students at the district level. Eleven urban districts participated in the third TUDA in mathematics in 2007. Students from these districts took the same assessment as those students sampled nationally for the main NAEP mathematics assessment, and their data were included as part of the national and state results presented in other 2007 NAEP reports.

The Mathematics Framework

The NAEP mathematics framework serves as the blueprint for the assessment, describing the specific mathematical skills that should be assessed at grades 4 and 8. Developed under the direction of the National Assessment Governing Board, the framework incorporates ideas and input from mathematicians, school administrators, policymakers, teachers, parents, and others.

The NAEP mathematics framework was first used to guide the development of the 1990 assessment and has continued to be used through 2007. Updates to the framework over the years have provided more detail regarding the assessment design but did not change the content, allowing student performance in 2007 to be compared with previous years. For more information on the framework, visit http://www.nagb.org.

MATHEMATICS CONTENT AREAS

Number properties and operations measures students' understanding of ways to represent, calculate, and estimate with numbers.

Measurement measures students' knowledge of measurement attributes, such as capacity and temperature, and geometric attributes, such as length, area, and volume.

Geometry measures students' knowledge and understanding of shapes in a plane and in space.

Data analysis and probability measures students' understanding of data representation, characteristics of data sets, experiments and samples, and probability.

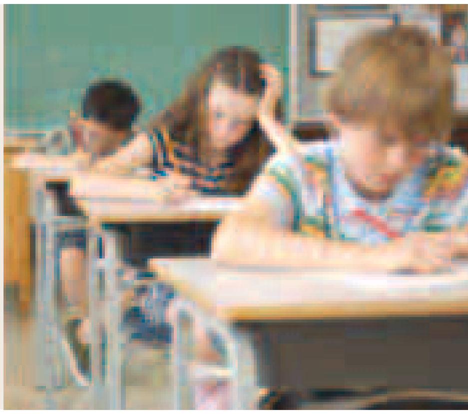
Algebra measures students' understanding of patterns, using variables, algebraic representation, and functions.

LEVELS OF MATHEMATICAL COMPLEXITY

Low complexity questions typically specify what a student is to do, which is often to carry out a routine mathematical procedure.

Moderate complexity questions involve more flexibility of thinking and often require a response with multiple steps.

High complexity questions make heavier demands on students, and often require abstract reasoning or analysis in a novel situation.



The framework details the mathematics objectives appropriate for grades 4 and 8. The topics covered by the framework include properties of numbers and operations, proportional reasoning, systems of measurement, relationships between geometric figures, data representation, probability, algebraic representations, equations and inequalities, and mathematical reasoning in various content areas.

Two dimensions of mathematics, content areas and mathematical complexity, are used to guide the assessment. Each item is designed to measure one of the five content areas. However, certain aspects of mathematics, such as computation, occur in all content areas. The level of complexity of a mathematics question is determined by the cognitive demands that it places on students.

Assessment Design

Because of the breadth of the content covered in the NAEP mathematics assessment, each student took just a portion of the test, consisting of two 25-minute sections. Testing time was divided evenly between multiple-choice and constructed-response (i.e., open-ended) questions. Some questions incorporated the use of rulers (at grade 4) or ruler/protractors (at grade 8), and some questions incorporated the use of geometric shapes or other manipulatives that were provided for students. On approximately one-third of the assessment, a four-function calculator was provided for students at grade 4, and a scientific calculator was provided for students at grade 8.

The distribution of questions among each content area differs somewhat by grade to reflect the knowledge and skills appropriate for each grade level. Table 1 shows the distribution across the content areas for grades 4 and 8, as recommended in the framework.

Table 1. **Target percentage distribution of NAEP mathematics questions, by grade and content area: 2007**

Content area	Grade 4	Grade 8
Number properties and operations	40%	20%
Measurement	20%	15%
Geometry	15%	20%
Data analysis and probability	10%	15%
Algebra	15%	30%

SOURCE: U.S. Department of Education, National Assessment Governing Board, Mathematics Framework for the 2007 National Assessment of Educational Progress, 2006.

Reporting NAEP Results

Mathematics results are presented for the following 11 urban districts: Atlanta, Austin, Boston, Charlotte-Mecklenburg, Chicago, Cleveland, the District of Columbia, Houston, Los Angeles, New York City, and San Diego. Results for scale scores and achievement levels are presented separately for grades 4 and 8 in the sections that follow. Immediately after the overall results and sample test questions, two-page profiles of each district show trend comparisons with the district's home state NAEP results, and trends for lower-income students and racial/ethnic groups.

Representative samples of between 1,100 and 2,800 fourth-graders and between 900 and 2,000 eighth-graders were assessed in each district. Sample sizes are proportionate to district enrollment. See appendix table A-1 for the number of participating schools and the number of students in each district. The performance of students in each urban district is compared to the performance of public school students in the nation, large central cities (i.e., cities with populations of 250,000 or more), and other participating districts. The comparison with large central cities is made because these students represent a peer group with characteristics that are most similar to the characteristics of students in the 11 urban districts.

All of the 11 urban districts that participated in the 2007 assessment also participated in the 2005 TUDA, and all except Austin participated in 2003, allowing for comparisons in performance over time.

Scale Scores

NAEP mathematics results are reported on a 0–500 scale. Because NAEP scales are developed independently for each subject, average scores cannot be compared across subjects even when the scale has the same range.

Achievement Levels

Based on recommendations from policymakers, educators, and members of the general public, the Governing Board sets specific achievement levels for each subject area and grade. Achievement levels are performance standards showing what students should know and be able to do. They provide another perspective with which to interpret student performance. NAEP results are reported as percentages of students performing at or above the *Basic* and *Proficient* levels and at the *Advanced* level.

As provided by law, NCES, upon review of congressionally mandated evaluations of NAEP, has determined that achievement levels are to be used on a trial basis and should be interpreted with caution. The NAEP achievement levels have been widely used by national and state officials.

NAEP ACHIEVEMENT LEVELS

BASIC denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at a given grade.

PROFICIENT represents solid academic performance. Students reaching this level have demonstrated competency over challenging subject matter.

ADVANCED represents superior performance.

Accommodations and Exclusions in NAEP

Testing accommodations, such as extra testing time or individual rather than group administration, are provided for students with disabilities or English language learners who could not fairly and accurately demonstrate their abilities without modified test administration procedures.

Even with the availability of accommodations, there still remains a portion of students excluded from the NAEP assessment. Variation in exclusion and accommodation rates due to differences in policies and practices regarding the identification and inclusion of students with disabilities and English language learners should be taken into consideration when comparing students' performance over time and across districts. While the effect of exclusion is not precisely known, comparisons of performance results across districts could be affected if exclusion rates are comparatively high or vary widely over time. See appendix tables A-2 and A-3 for the percentages of students accommodated and excluded in each district. More information about NAEP's policy on inclusion and types of accommodations offered is available at http://nces.ed.gov/nationsreportcard/about/inclusion.asp.

Interpreting Results

Changes in performance results over time may reflect not only changes in students' knowledge and skills, but also other factors, such as changes in student demographics, education programs and policies (including policies regarding exclusion), and teacher qualifications.

Widely accepted statistical standards are used for reporting results. Findings are reported based on a statistical significance level set at .05 with appropriate adjustments for multiple comparisons, as well as adjustments for the part-whole relationship when individual districts are compared to results for large central cities or the nation. In the tables and figures, the symbol (*) indicates that scores or percentages are significantly different from each other.

Score differences or gaps cited in this report are calculated based on differences between unrounded numbers. Therefore, the reader may find that the score difference cited in the text may not be identical to the difference obtained from subtracting the rounded values shown in the accompanying tables or figures.

In addition to the overall performance of students, results are presented by different demographic characteristics (for example, race/ethnicity or family income level). District results for other student groups can be found on the NAEP Data Explorer at http://nces.ed.gov/nationsreportcard/nde.

Simple associations between background characteristics and achievement cannot be used to establish cause-and-effect relationships. A complex mix of educational and socioeconomic factors may interact to affect student performance. For additional information, see the Technical Notes or visit http://nationsreportcard.gov.

SEE THE TABLES IN THE APPENDIX FOR INFORMATION ON

- students with disabilities (SD) and English language learners (ELL),
- selected percentile scores,
- performance by race/ethnicity,
- trends in score gaps by race/ethnicity, and
- performance by eligibility status for the National School Lunch Program.

4th Grade

Scores up for most districts since 2003

Eight of the 10 districts that participated in 2003 had higher scores in 2007 (figure 1). Of these eight districts, four (Atlanta, Boston, the District of Columbia, and New York City) had higher scores in 2007 than in both 2003 and 2005. Only one district, Cleveland, had a lower average score in 2007 than in 2005. By comparison, average scores for public schools in the nation and in large central cities were up in 2007 compared with 2003 and 2005. Of the eight districts with gains in 2007 compared to 2003, one had a 5-point gain similar to the nation, and seven had gains of 6 to 13 points.

Many districts score higher than large central cities, but most score lower than the nation

When compared to the average mathematics score in large central cities nationwide in 2007, students in Austin, Boston, Charlotte, Houston, New York City, and San Diego scored higher, while students in Atlanta, Chicago, Cleveland, the District of Columbia, and Los Angeles scored lower (figure 3).

Fourth-graders in Charlotte scored higher than, and students in Austin scored not significantly different from, their peers in the nation in 2007. Students in the other nine participating districts scored lower, on average, than the nation.

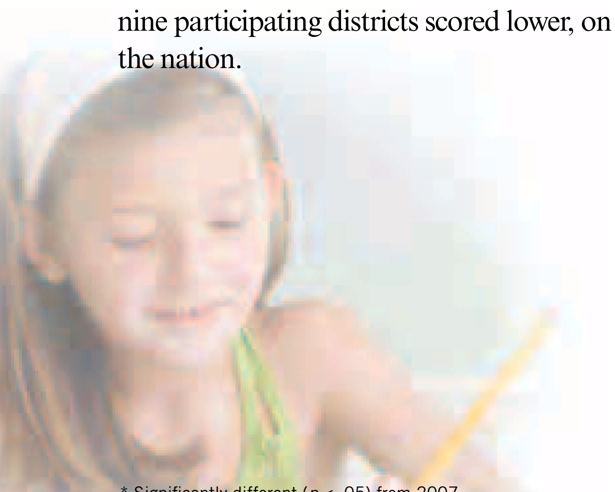
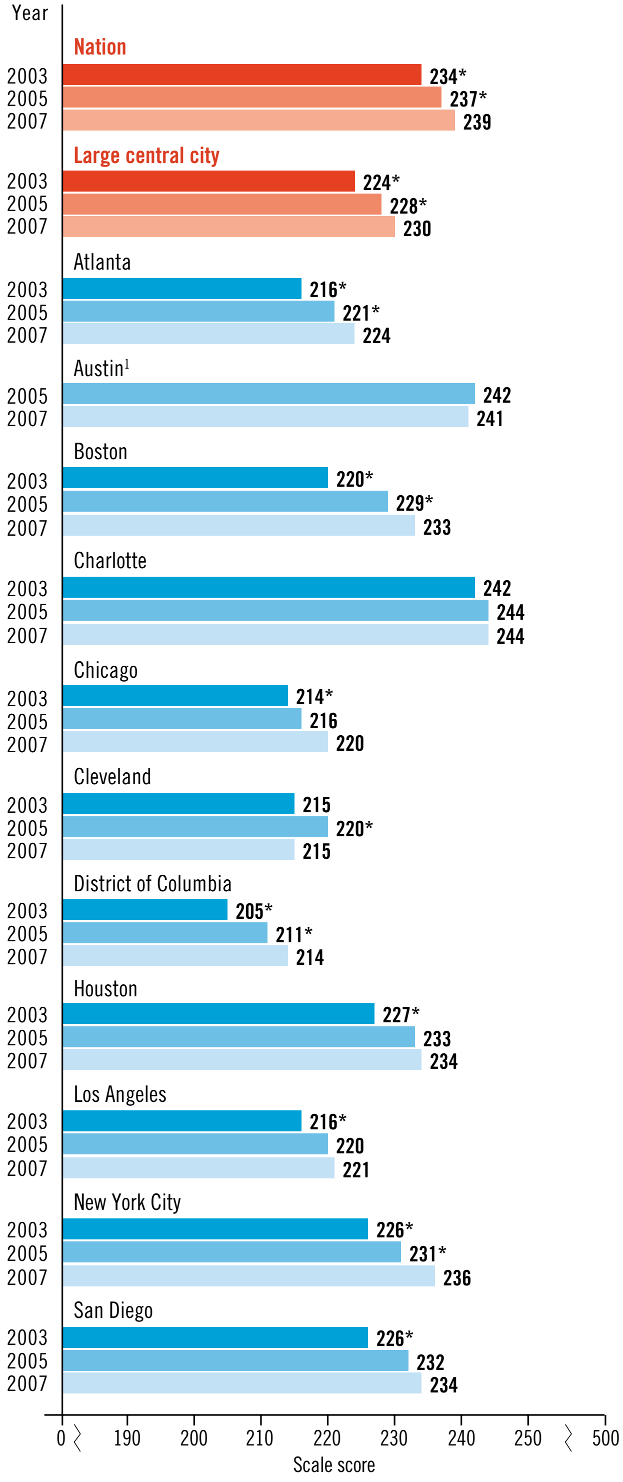


Figure 1. **Trend in average scores for fourth-grade public school students in NAEP mathematics, by jurisdiction**



* Significantly different ($p < .05$) from 2007.

[1] District did not participate in 2003.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2003, 2005, and 2007 Trial Urban District Mathematics Assessments.

Most districts improve in percentages at or above *Basic* and *Proficient* since 2003

The percentages of students performing at NAEP achievement levels provide a broader look at the range of student performance. For example, although average scores were low compared to the nation, there were students in all districts who scored at or above the *Proficient* level and almost all districts had students in the *Advanced* level (table 2).

Comparing the district percentages at or above *Basic* over time shows that 4 of 11 participating districts improved in 2007 compared with 2005. The percentage at or above *Basic* in Cleveland declined over the same period. Eight districts improved percentages at or above *Basic* in 2007 compared with 2003. Percentages at or above *Proficient* improved in five districts when comparing 2007 with 2005, and in eight districts when comparing 2007 with 2003.

Compared to public schools nationally, the majority of the participating districts had lower percentages of students at or above *Basic* and at or above *Proficient* in 2007. In Charlotte, percentages for students for both achievement levels were higher than those in the nation.

When comparing results to those of students in large central cities nationally, 6 of the 11 participating districts had higher percentages of students performing at or above the *Basic* level, and 4 districts had higher percentages performing at or above *Proficient*. Achievement-level results by race/ethnicity are available at http://nationsreportcard.gov/tuda_math_2007/data.asp.

Table 2. **Achievement-level results for fourth-grade public school students in NAEP mathematics, by jurisdiction: 2003, 2005, and 2007**

	Percentage of students											
	Below *Basic*			At or above *Basic*			At or above *Proficient*			At *Advanced*		
Jurisdiction	2003	2005	2007	2003	2005	2007	2003	2005	2007	2003	2005	2007
Nation	24***	21***	19*	76***	79***	81*	31***	35***	39*	4***	5***	5*
Large central city	37***	32***	30**	63***	68***	70**	20***	24***	28**	2***	3	4**
Atlanta	50***	43	39*,**	50***	57	61*,**	13***	17***	20*,**	2	3	3**
Austin	—	15	17*	—	85	83*	—	40	40*	—	7	7*
Boston	41***	28***	23*,**	59***	72***	77*,**	12***	22***	27**	1***	2	3**
Charlotte	16	14	15*,**	84	86	85*,**	41	44	44*,**	6	9	8*,**
Chicago	50***	48***	42*,**	50***	52***	58*,**	10***	13	16*,**	1	1	1*,**
Cleveland	49	40***	47*,**	51	60***	53*,**	10	13	10*,**	#	#	#*,**
District of Columbia	64***	55***	51*,**	36***	45***	49*,**	7***	10***	14*,**	1***	1***	3*,**
Houston	30***	23	20*	70***	77	80*	18***	26	28**	1	3	3**
Los Angeles	48***	42	40*,**	52***	58	60*,**	13***	18	19*,**	1***	2	2*,**
New York City	33***	27***	21*	67***	73***	79*	21***	26***	34*,**	2***	3	5
San Diego	34***	26	26*,**	66***	74	74*,**	20***	29***	35*	2***	4	5

— Not available. District did not participate in 2003.
Rounds to zero.
* Significantly different ($p < .05$) from large central city public schools in 2007.
** Significantly different ($p < .05$) from nation (public schools) in 2007.
*** Significantly different ($p < .05$) from 2007.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2003, 2005, and 2007 Trial Urban District Mathematics Assessments.

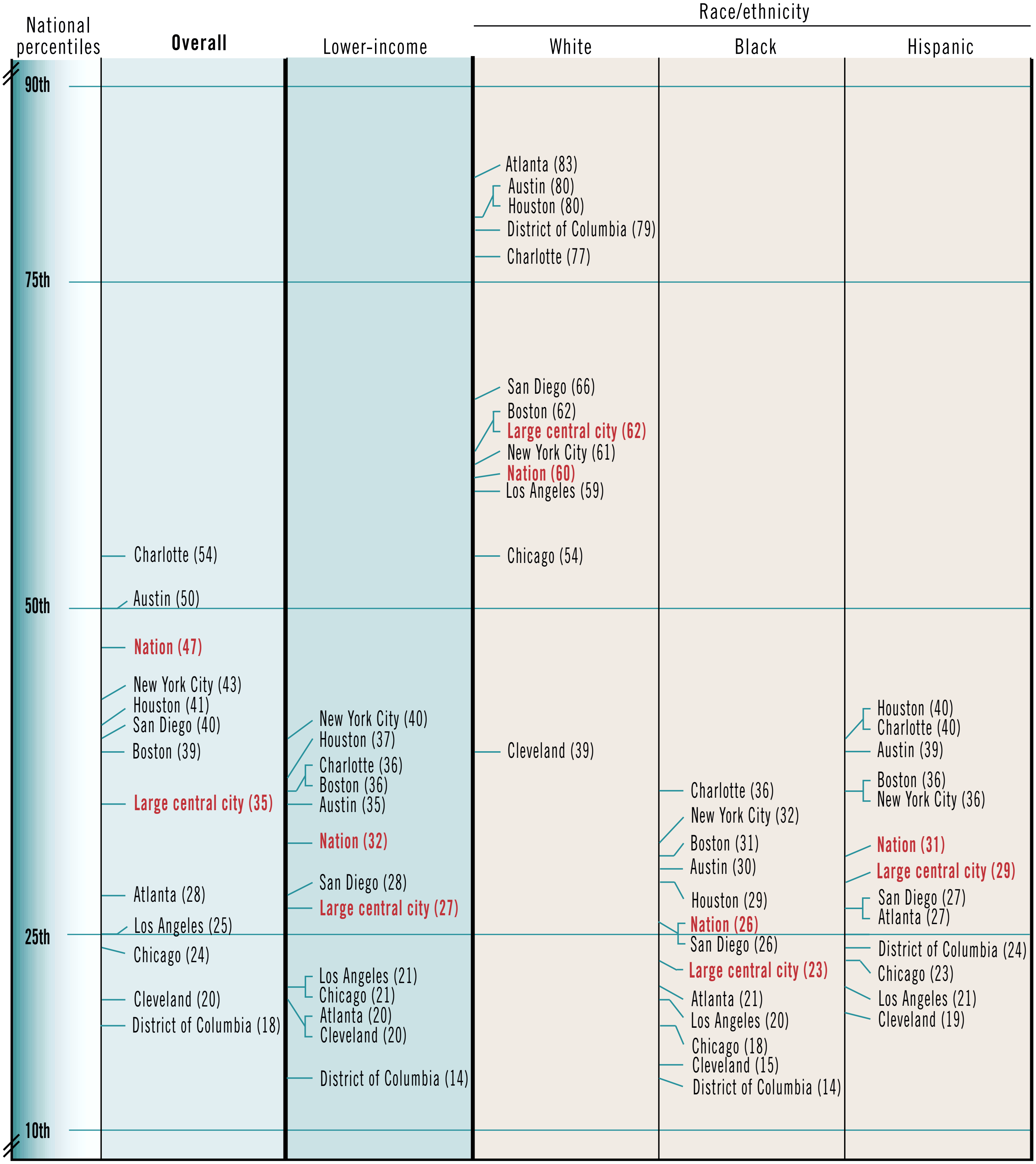
Percentile rankings vary by demographic groups

Figure 2 on the opposite page shows how groups of students within each participating district compared with the NAEP national public school percentiles. The average score for the group was used to determine its percentile rank compared with public schools nationally. The scores for the nation and large central cities are also plotted. For example, the average score for Hispanic students in Houston was at the 40th percentile. This means that these students performed as well as or better than 40 percent of students nationwide, including their Hispanic counterparts in large central cities whose average score was at the 29th percentile.

The percentile range for the four selected student groups is wide—from the 83rd percentile for White students in Atlanta to the 14th percentile for lower-income and Black students in the District of Columbia. The relative rankings of student groups versus same-category peers in large central cities and the nation can be seen in figure 2. For example, Black fourth-graders in Austin, Boston, Charlotte, and New York City outscored their peers in both the nation and in large central cities. Similarly, Hispanic students in Austin, Boston, Charlotte, Houston, and New York City had higher average scores and percentile rankings than their counterparts in the nation and large central cities.

Additional results for racial/ethnic groups are provided in the district profiles beginning on page 32 and in the appendix in tables A-5 and A-6 and figures A-1 and A-2.

Figure 2. **National percentile rankings for urban districts based on average scores for fourth-grade public school students in NAEP mathematics, by lower-income status and selected race/ethnicity categories: 2007**



NOTE: Groups not shown are included in overall scores. In NAEP, lower-income students are students identified as eligible for the National School Lunch Program. Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The 50th percentile represents the middle score in the distribution of scores for public school students nationally. The average score for these students, however, fell below that point at the 47th percentile because there was a greater concentration of scores toward the lower end of the scale compared to the higher end.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

For lower-income students, fewer performance differences among districts

The two figures below show how the performance across districts varies according to income. Figure 3 identifies significant differences when comparing the average scores for all students in participating districts, the nation, and large central cities.

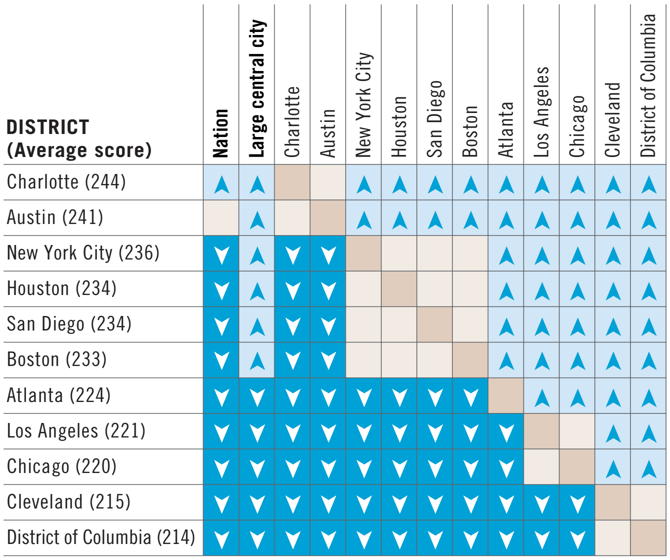
Participating districts have greater percentages of students from lower-income families than public schools nationally (see table 4, page 30). NAEP uses students' eligibility for the National School Lunch Program as an indicator of poverty.[1] Eligible students are from lower-income families and tend to have average scores that are significantly below those of students from higher-income families.

When all public school students are considered, the highest-scoring districts have some of the smallest percentages of lower-income students. The lowest-performing districts, however, have some of the largest percentages of lower-income students. This contrast helps in understanding why the overall average scores for most participating districts are below that of the nation.

Figure 4 shows the cross-district comparisons for lower-income students only. The pattern of results and ranking among districts for lower-income students differs from the comparison shown in figure 3 for all students. For example, New York City, Houston, and Boston move up in the rankings, while Cleveland and the District of Columbia are unchanged. In addition, there are fewer differences in performance across the districts.

Read across each district's row to determine whether the average score of that district was higher than, not significantly different from, or lower than the jurisdiction in the column heading. The direction of the arrow indicates whether the district in the row is higher than (up arrow), lower than (down arrow), or not significantly different from (no arrow) the jurisdiction in the column heading.

Figure 3. **Cross-district comparison of average scores for all fourth-grade public school students in NAEP mathematics: 2007**



DISTRICT (Average score)	**Nation**	**Large central city**	Charlotte	Austin	New York City	Houston	San Diego	Boston	Atlanta	Los Angeles	Chicago	Cleveland	District of Columbia
Charlotte (244)	▲	▲	▨	☐	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austin (241)	☐	▲	☐	▨	▲	▲	▲	▲	▲	▲	▲	▲	▲
New York City (236)	▼	▲	▼	▼	▨	☐	☐	☐	▲	▲	▲	▲	▲
Houston (234)	▼	▲	▼	▼	☐	▨	☐	☐	▲	▲	▲	▲	▲
San Diego (234)	▼	▲	▼	▼	☐	☐	▨	☐	▲	▲	▲	▲	▲
Boston (233)	▼	▲	▼	▼	☐	☐	☐	▨	▲	▲	▲	▲	▲
Atlanta (224)	▼	▼	▼	▼	▼	▼	▼	▼	▨	▲	▲	▲	▲
Los Angeles (221)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▨	☐	▲	▲
Chicago (220)	▼	▼	▼	▼	▼	▼	▼	▼	▼	☐	▨	▲	▲
Cleveland (215)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▨	☐
District of Columbia (214)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	☐	▨

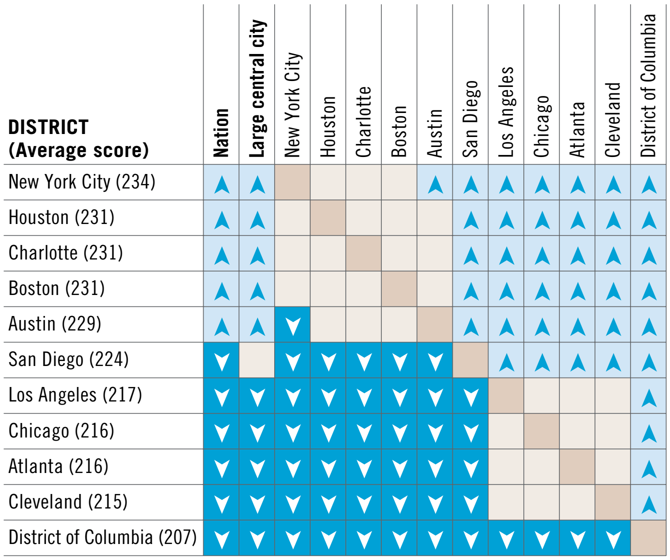
▲ District had higher average scale score than the jurisdiction listed at the top of the column.

☐ No statistically significant difference detected from the jurisdiction listed at the top of the column.

▼ District had lower average scale score than the jurisdiction listed at the top of the column.

▨ Comparison not made.

Figure 4. **Cross-district comparison of average scores for lower-income fourth-grade public school students in NAEP mathematics: 2007**



DISTRICT (Average score)	**Nation**	**Large central city**	New York City	Houston	Charlotte	Boston	Austin	San Diego	Los Angeles	Chicago	Atlanta	Cleveland	District of Columbia
New York City (234)	▲	▲	▨	☐	☐	☐	▲	▲	▲	▲	▲	▲	▲
Houston (231)	▲	▲	☐	▨	☐	☐	☐	▲	▲	▲	▲	▲	▲
Charlotte (231)	▲	▲	☐	☐	▨	☐	☐	▲	▲	▲	▲	▲	▲
Boston (231)	▲	▲	☐	☐	☐	▨	☐	▲	▲	▲	▲	▲	▲
Austin (229)	▲	▲	▼	☐	☐	☐	▨	▲	▲	▲	▲	▲	▲
San Diego (224)	▼	☐	▼	▼	▼	▼	▼	▨	▲	▲	▲	▲	▲
Los Angeles (217)	▼	▼	▼	▼	▼	▼	▼	▼	▨	☐	☐	☐	▲
Chicago (216)	▼	▼	▼	▼	▼	▼	▼	▼	☐	▨	☐	☐	▲
Atlanta (216)	▼	▼	▼	▼	▼	▼	▼	▼	☐	☐	▨	☐	▲
Cleveland (215)	▼	▼	▼	▼	▼	▼	▼	▼	☐	☐	☐	▨	▲
District of Columbia (207)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▨

NOTE: The average score for all students in the nation was 239 and for students from lower-income families was 227. The average score for all students in large central cities was 230 and for students from lower-income families was 223. In NAEP, lower-income students are students identified as eligible for the National School Lunch Program.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

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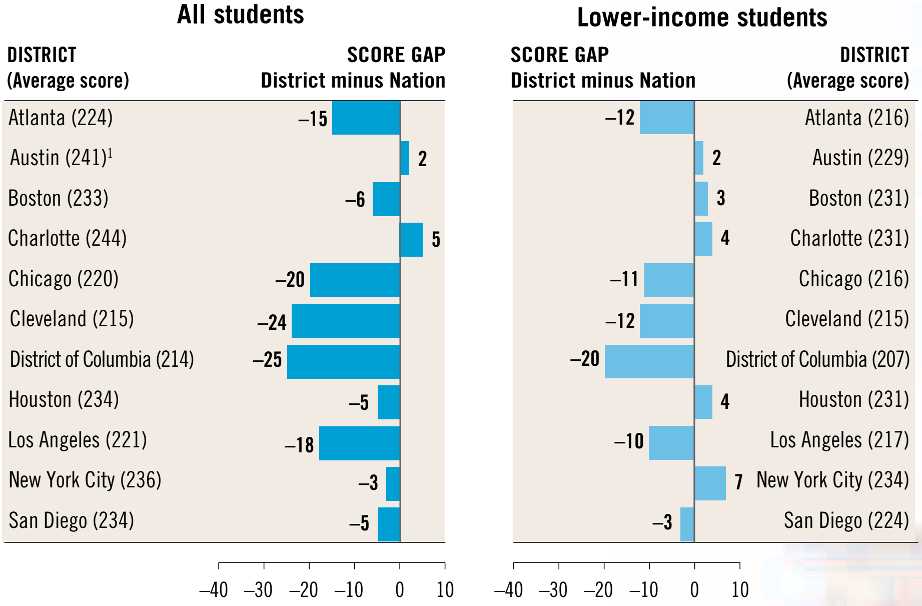
[1] Under the guidelines of the National School Lunch Program, children from families with incomes below 130 percent of the poverty level are eligible for free meals. Those from families with incomes between 130 and 185 percent of the poverty level are eligible for reduced-price meals. For the period July 1, 2006 through June 30, 2007, for a family of four, 130 percent of the poverty level was $26,000, and 185 percent was $37,000.

Nation – district gaps narrower for lower-income students

The size of the score gap between the performance of students in the districts and students nationally changes when looking at lower-income students only, as shown in figure 5. As discussed previously, most of the districts scored lower on average than the nation. These differences ranged from –3 to –25 points (shown by the bars on the left side of the figure). Students in Charlotte scored higher than the nation, and students in Austin scored not significantly different from the nation.

These gaps in overall scores may be associated with the greater percentages of lower-income students in the districts who usually have lower mathematics performance. The right side of the figure shows the gaps between lower-income students in the nation and in each district. The gaps between the nation and the districts for lower-income students are generally smaller than the gaps for all students. Using Cleveland as an example, the district's average score was 24 points lower than the national average. Cleveland's average score for lower-income students, however, was 12 points lower than the average for lower-income students nationally. For trend results of lower-income students in each district and their peers nationwide, see the section on individual districts later in this report.

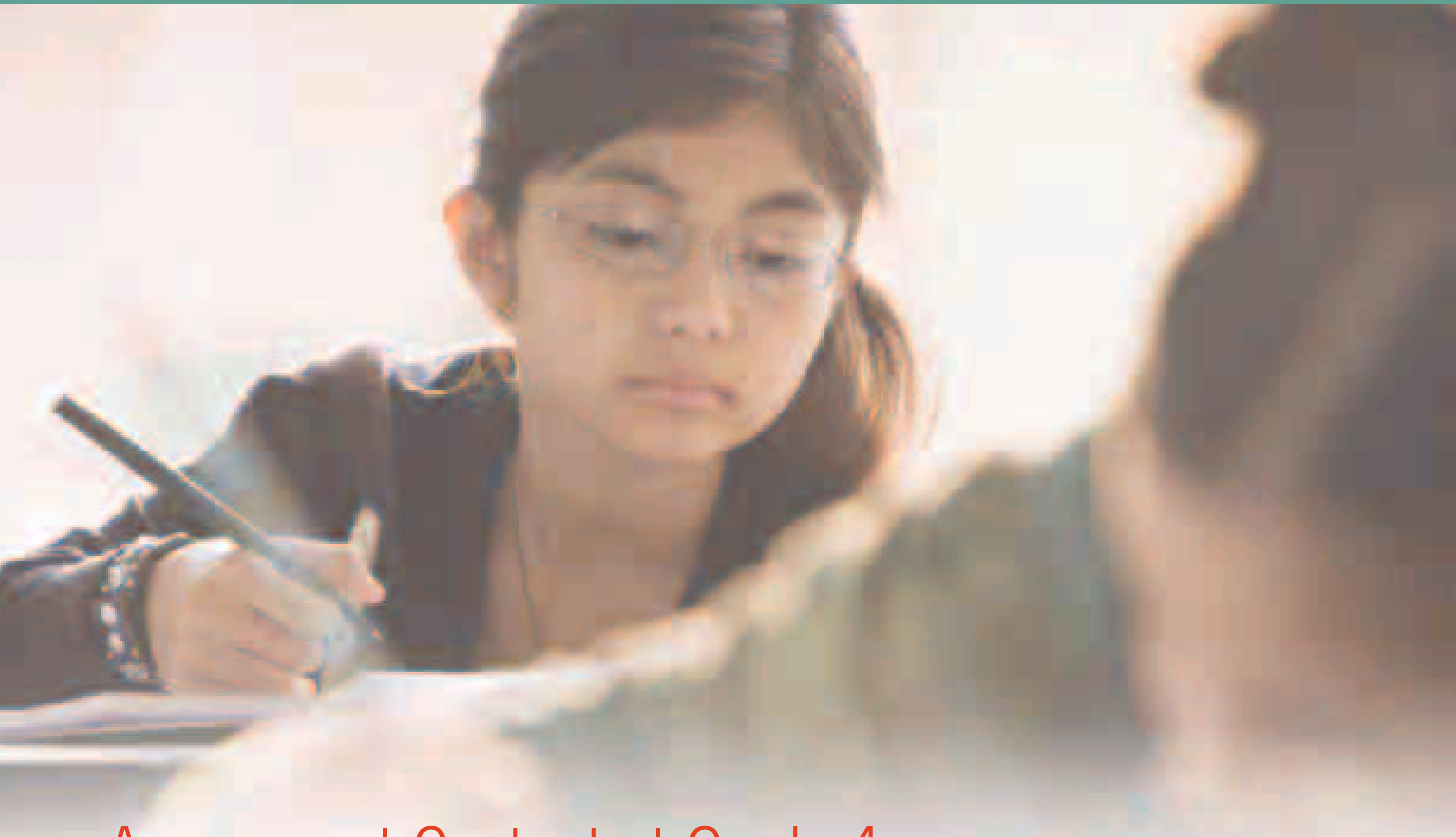
Figure 5. **Average scores and score gaps between the nation and districts for all students and lower-income fourth-grade public school students in NAEP mathematics, by urban district: 2007**



[1] The score-point difference between this district and the nation was not statistically significant.

NOTE: The average score for all students in the nation was 239 and for students from lower-income families was 227. In NAEP, lower-income students are students identified as eligible for the National School Lunch Program. Score gaps are calculated based on differences between unrounded average scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.



Assessment Content at Grade 4

To interpret the results in meaningful ways, it is important to understand the content of the assessment. Content was varied to reflect differences in the skills students were expected to have at each grade.

Of the 166 questions that made up the fourth-grade mathematics assessment, the largest percentage (40 percent) focused on number properties and operations. It was expected that fourth-graders should have a solid grasp of whole numbers and a beginning understanding of fractions.

In measurement, the emphasis was on length, including perimeter, distance, and height. Students were expected to demonstrate knowledge of common customary and metric units. In geometry, students were expected to be familiar with simple figures in 2- and 3-dimensions and their attributes. In data analysis and probability, students were expected to demonstrate understanding of how data are collected and organized and basic concepts of probability. In algebra at this grade, the emphasis was on recognizing, describing, and extending patterns and rules.

Mathematics Achievement Levels at Grade 4

The following descriptions are abbreviated versions of the full achievement-level descriptions for grade 4 mathematics. The cut score depicting the lowest score representative of that level is noted in parentheses.

Basic (214): Fourth-graders performing at the *Basic* level should be able to estimate and use basic facts to perform simple computations with whole numbers; show some understanding of fractions and decimals; and solve some simple real-world problems in all NAEP content areas. Students at this level should be able to use—though not always accurately—four-function calculators, rulers, and geometric shapes. Their written responses are often minimal and presented without supporting information.

Proficient (249): Fourth-graders performing at the *Proficient* level should be able to use whole numbers to estimate, compute, and determine whether results are reasonable. They should have a conceptual understanding of fractions and decimals; be able to solve real-world problems in all NAEP content areas; and use four-function calculators, rulers, and geometric shapes appropriately. Students performing at the *Proficient* level should employ problem-solving strategies such as identifying and using appropriate information. Their written solutions should be organized and presented both with supporting information and explanations of how they were achieved.

Advanced (282): Fourth-graders performing at the *Advanced* level should be able to solve complex nonroutine real-world problems in all NAEP content areas. They should display mastery in the use of four-function calculators, rulers, and geometric shapes. These students are expected to draw logical conclusions and justify answers and solution processes by explaining why, as well as how, they were achieved. They should go beyond the obvious in their interpretations and be able to communicate their thoughts clearly and concisely.

The full descriptions can be found at http://www.nagb.org/frameworks/math_07.pdf.

Sample Question About Number Properties and Operations

This sample question measures fourth-graders' performance in the number properties and operations content area. In particular, it addresses the "Number operations" subtopic, which focuses on computation, the effects of operations on numbers, and the relationships between operations. The framework objective measured is "Solve application problems involving numbers and operations." Students were not permitted to use a calculator to solve this problem.

One way to arrive at the correct answer (choice B) is to first use subtraction to determine that the bridge was built in 1926, and then use addition to determine that it was 50 years old in 1976. The incorrect choice A can be obtained by subtracting 50 years from 2001. The other incorrect choices (C and D) represent computation errors.

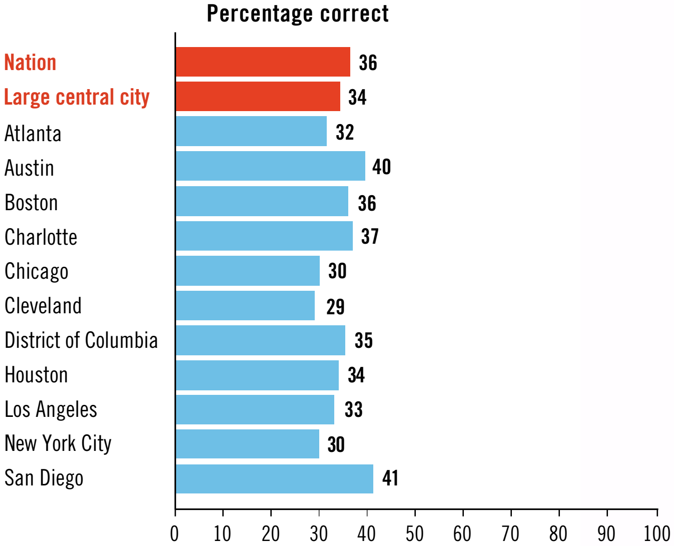
The figure below shows the percentages of fourth-graders who selected the correct answer to the question. Thirty-six percent of fourth-grade public school students in the nation selected the correct answer. The percentage of correct responses in each of the districts ranged from 29 percent in Cleveland to 41 percent in San Diego.

The Ben Franklin Bridge was 75 years old in 2001. In what year was the bridge 50 years old?

Ⓐ 1951 Ⓒ 1984

Ⓑ 1976 Ⓓ 1986

Percentage correct for fourth-grade public school students in 2007, by jurisdiction



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

Sample Question About Data Analysis and Probability

This sample question measures fourth-graders' performance in the data analysis and probability content area. It addresses the "Probability" subtopic, which focuses on simple probability and counting or representing the outcomes of a given event. The framework objective measured by this question is "Use informal probabilistic thinking to describe chance events." Students were not permitted to use a calculator to solve this problem.

Student responses for this question were rated using the following three-level scoring guide:

Correct—Response indicates that a red cube is most likely to be picked and indicates that the probability is 3 out of 6 (or equivalent).

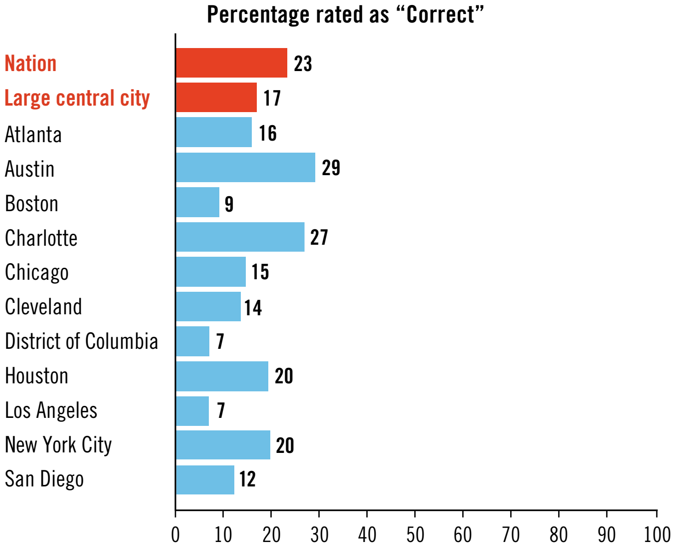
Partial—Response indicates that a red cube is most likely to be picked or indicates that the probability is 3 out of 6 (or equivalent).

Incorrect—All incorrect responses.

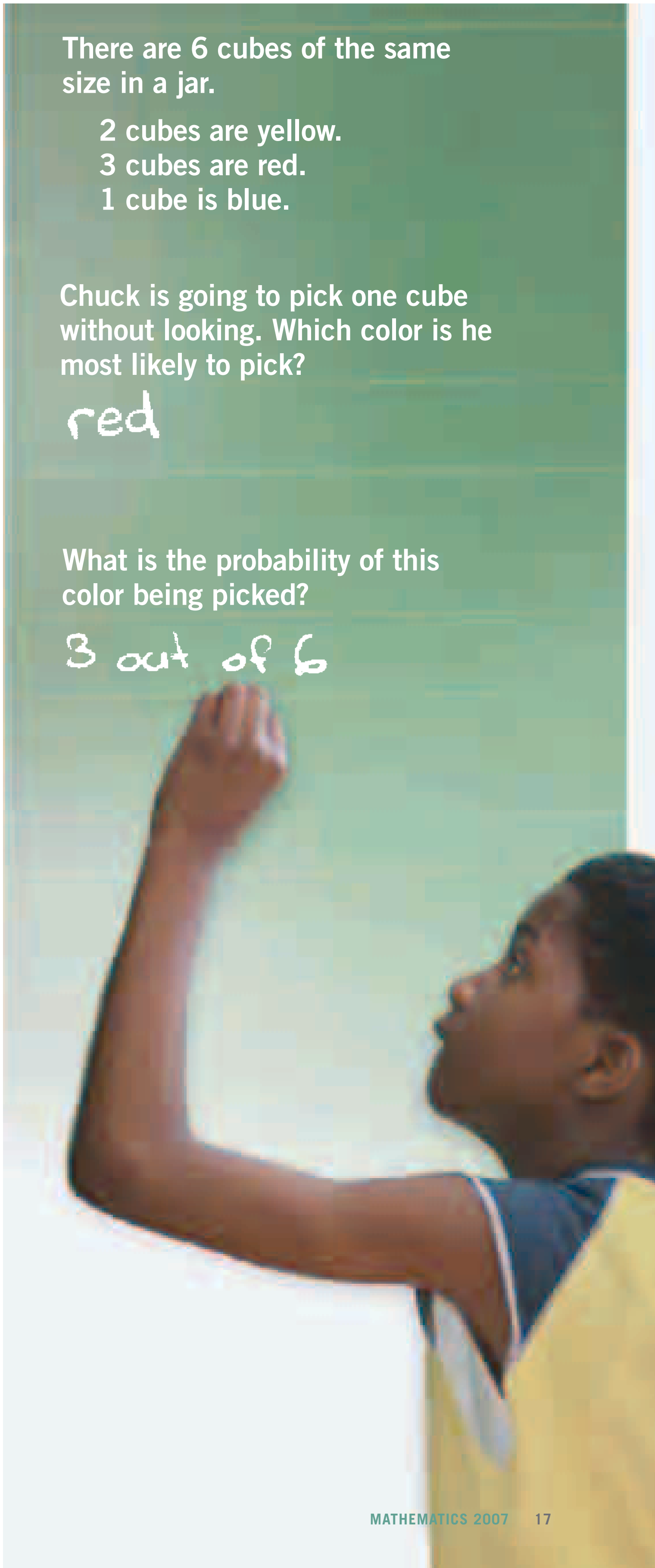
The student response presented here was rated as "Correct" because both parts of the question were answered correctly.

Twenty-three percent of fourth-grade public school students in the nation gave a response that was rated "Correct" for this question. The percentage of student responses rated as "Correct" in the districts ranged from 7 percent in the District of Columbia and Los Angeles to 29 percent in Austin.

Percentage rated as "Correct" for fourth-grade public school students in 2007, by jurisdiction



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.



There are 6 cubes of the same size in a jar.

2 cubes are yellow.
3 cubes are red.
1 cube is blue.

Chuck is going to pick one cube without looking. Which color is he most likely to pick?

red

What is the probability of this color being picked?

3 out of 6

8th Grade

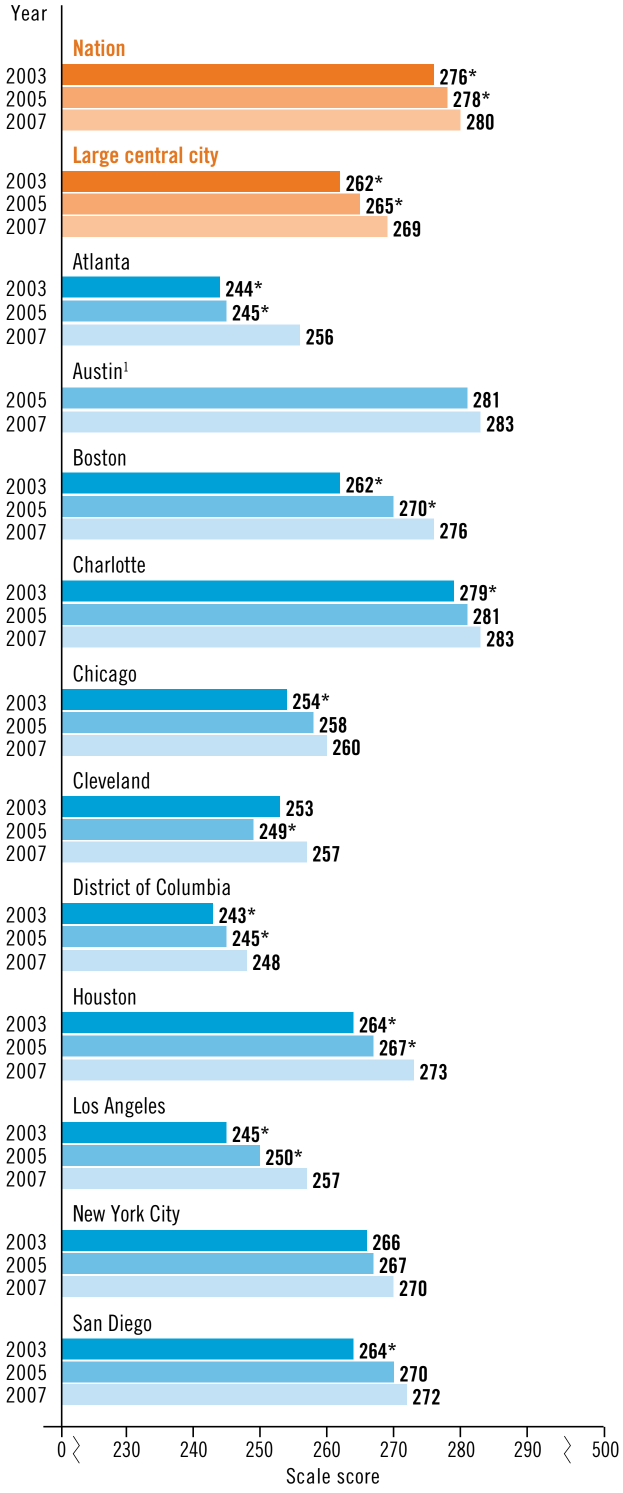
Scores rise in most districts since 2003

Eight of the 10 districts that participated in the first TUDA in mathematics had higher average scores in 2007 than in 2003 (figure 6). Of these eight districts, five (Atlanta, Boston, the District of Columbia, Houston, and Los Angeles) showed improvement, with higher scores in 2007 compared to both 2003 and 2005. By comparison, average scores for public schools in the nation and in large central cities were also up in 2007 compared with 2003 and 2005.

Many districts perform at least as well as large central cities, but most lower than nation

In 2007, eighth-graders in Charlotte and Austin scored higher than their peers in public schools in the nation, but students in the other nine districts scored lower (figure 6). On average, students in Austin, Boston, Charlotte, Houston, New York City, and San Diego scored higher than or not significantly different from their peers in large central cities, while students in Atlanta, Chicago, Cleveland, the District of Columbia, and Los Angeles scored lower (figure 8).

Figure 6. **Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction**



* Significantly different ($p < .05$) from 2007.

[1] District did not participate in 2003.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2003, 2005, and 2007 Trial Urban District Mathematics Assessments.

Many districts improve in percentages at or above *Basic* and *Proficient* since 2003

As in grade 4, despite low average scores, there were students in all districts at grade 8 who scored at or above the *Proficient* level, and in almost all districts there were eighth-graders who scored at the *Advanced* level (table 3).

Comparing the district percentages at or above *Basic* over time shows that 5 of 11 participating districts improved in 2007 compared with 2005. Eight districts improved their 2007 percentages at or above *Basic* compared with 2003. Percentages at or above *Proficient* improved in four districts when comparing 2007 with 2005, and in six districts when comparing 2007 with 2003.

The five districts that performed below the average score for large central cities also fell below large central cities in percentages of students at or above *Basic* and at or above *Proficient*. Compared to public schools across the nation, 9 of the 11 participating districts had lower percentages of students at or above *Basic* and at or above *Proficient*. Austin had a higher percentage of students at or above *Proficient* than the nation, and both Austin and Charlotte had percentages of students at or above *Basic* that were not significantly different from the nation.

Table 3. **Achievement-level results for eighth-grade public school students in NAEP mathematics, by jurisdiction: 2003, 2005, and 2007**

	Percentage of students											
	Below *Basic*			At or above *Basic*			At or above *Proficient*			At *Advanced*		
Jurisdiction	2003	2005	2007	2003	2005	2007	2003	2005	2007	2003	2005	2007
Nation	33***	32***	30*	67***	68***	70*	27***	28***	31*	5***	6***	7*
Large central city	50***	47***	43**	50***	53***	57**	16***	19***	22**	3***	4	5**
Atlanta	70***	69***	59*,**	30***	31***	41*,**	6***	7***	11*,**	1	1	2*,**
Austin	—	32	28*	—	68	72*	—	33	34*,**	—	9	9*,**
Boston	52***	42***	35*,**	48***	58***	65*,**	17***	23***	27*,**	4***	6	7*
Charlotte	33	31	30*	67	69	70*	32	33	34*	7***	9	10*,**
Chicago	58***	55	51*,**	42***	45	49*,**	9	11	13*,**	1	2	2*,**
Cleveland	62***	66***	55*,**	38***	34***	45*,**	6	6	7*,**	#	#	#
District of Columbia	71***	69	66*,**	29***	31	34*,**	6***	7	8*,**	1	2	1*,**
Houston	48***	42***	35*,**	52***	58***	65*,**	12***	16***	21**	2	2	4
Los Angeles	68***	62***	55*,**	32***	38***	45*,**	7***	11***	14*,**	1***	2	2*,**
New York City	46	46	43**	54	54	57**	20	20	22**	4	5	6
San Diego	47***	39	38*,**	53***	61	62*,**	18***	22	24**	2***	4	5

— Not available. District did not participate in 2003.
Rounds to zero.
* Significantly different ($p < .05$) from large central city public schools in 2007.
** Significantly different ($p < .05$) from nation (public schools) in 2007.
*** Significantly different ($p < .05$) from 2007.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2003, 2005, and 2007 Trial Urban District Mathematics Assessments.

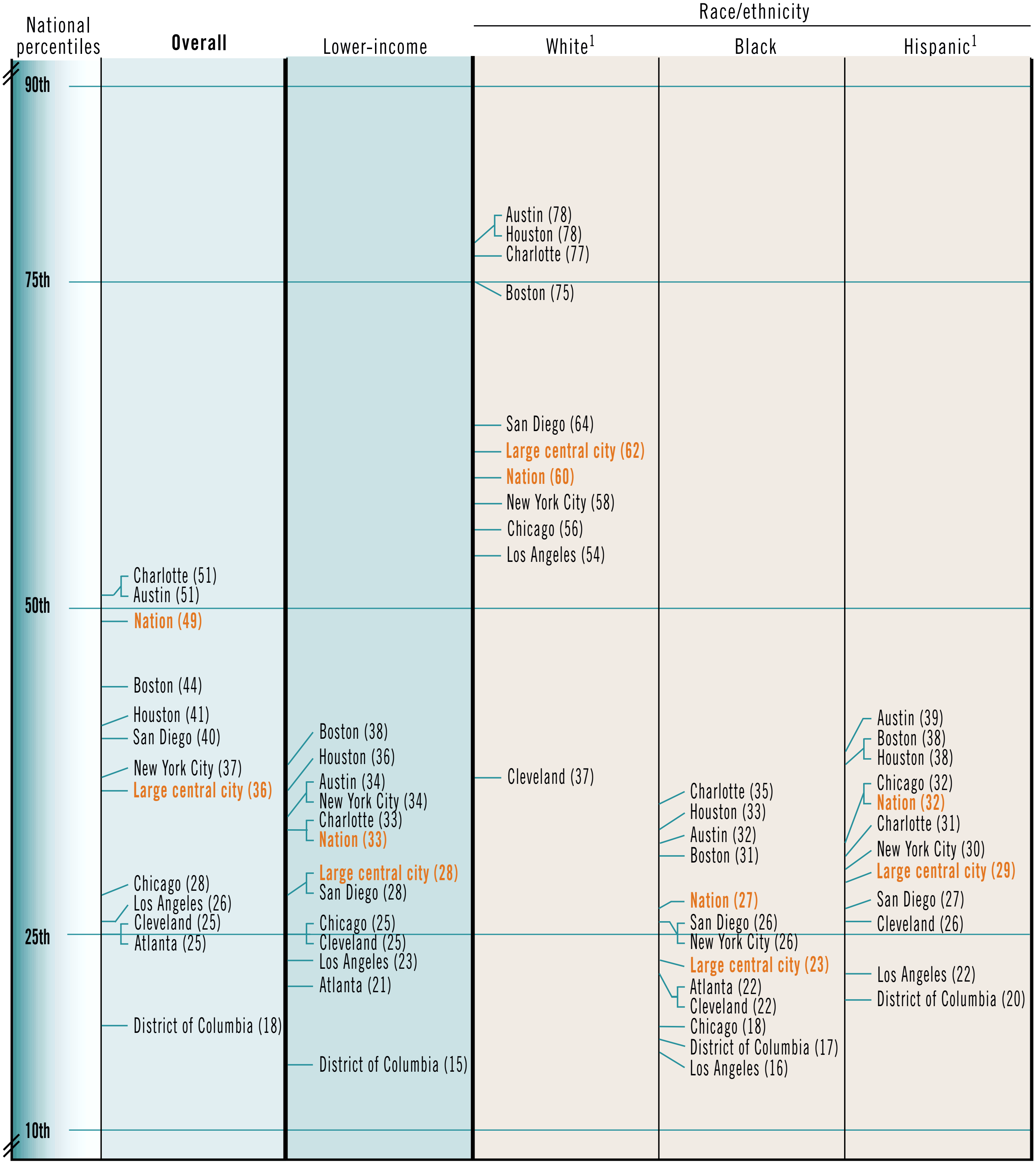
Percentile rankings vary by demographic groups

Figure 7 on the opposite page shows how groups of students within each participating district compared with the NAEP national public school percentiles. The average score for the group was used to determine its percentile rank compared with public schools nationally. The scores for the nation and large central cities are also plotted. For example, the average score for Hispanic students in Houston was at the 38th percentile. This means that these students performed as well as or better than 38 percent of students nationwide, including their Hispanic counterparts in large central cities whose average score was at the 29th percentile.

The percentile range for the four selected student groups is wide—from the 78th percentile for White students in Austin and Houston to the 15th percentile for lower-income students in the District of Columbia. The relative rankings of student groups versus same-category peers in large central cities and the nation can be seen in the figure. For example, Black eighth-graders in Austin, Boston, Charlotte, and Houston outscored their peers in both the nation and in large central cities. Similarly, Hispanic students in Austin, Boston, and Houston had higher average scores and percentile rankings than their counterparts in the nation and large central cities.

Additional results for racial/ethnic groups are provided in the district profiles beginning on page 32 and in the appendix in tables A-5 and A-6 and figures A-1 and A-2.

Figure 7. **National percentile rankings for urban districts based on average scores for eighth-grade public school students in NAEP mathematics, by lower-income status and selected race/ethnicity categories: 2007**



[1] Sample sizes were insufficient to permit reliable estimates for White and Hispanic students in Atlanta and White students in the District of Columbia.

NOTE: Groups not shown are included in overall scores. In NAEP, lower-income students are students identified as eligible for the National School Lunch Program. Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The 50th percentile represents the middle score in the distribution of scores for public school students nationally. The average score for these students, however, fell below that point at the 49th percentile because there was a greater concentration of scores toward the lower end of the scale compared to the higher end.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

For lower-income students, fewer performance differences among districts

Performance across districts varies as shown in the figures below depending on whether all students or only lower-income students are compared. Figure 8 identifies significant differences when comparing the average scores for all students in participating districts, as well as the nation and large central cities.

Participating districts typically have greater percentages of students from lower-income families than public schools nationally (see table 5, page 31). NAEP uses students' eligibility for the National School Lunch Program as an indicator of poverty. Eligible students (see note on page 12) are typically from lower-income families and tend to have average scores that are significantly below those of students from higher-income families.

When all public school students are considered, the highest-scoring districts have some of the smallest percentages of lower-income students. The lowest-performing districts, however, have some of the largest percentages. This contrast helps in understanding why the overall average scores for most participating districts are below that of the nation.

Figure 9 shows the cross-district comparisons for lower-income students only. Here, similar to the pattern for lower-income students in grade 4, the score ranking among districts changes from the ranking for all students. For example, Boston, Houston, and New York City move up in the rankings, while Chicago, Atlanta, and the District of Columbia are unchanged. In addition, there are fewer differences in performance across the districts.

Read across each district's row to determine whether the average score of that district was higher than, not significantly different from, or lower than the jurisdiction in the column heading. The direction of the arrow indicates whether the district in the row is higher than (up arrow), lower than (down arrow), or not significantly different from (no arrow) the jurisdiction in the column heading.

Figure 8. **Cross-district comparison of average scores for all eighth-grade public school students in NAEP mathematics: 2007**

DISTRICT (Average score)	**Nation**	**Large central city**	Charlotte	Austin	Boston	Houston	San Diego	New York City	Chicago	Los Angeles	Cleveland	Atlanta	District of Columbia
Charlotte (283)	▲	▲	▨	□	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austin (283)	▲	▲	□	▨	▲	▲	▲	▲	▲	▲	▲	▲	▲
Boston (276)	▼	▲	▼	▼	▨	□	▲	▲	▲	▲	▲	▲	▲
Houston (273)	▼	▲	▼	▼	□	▨	□	□	▲	▲	▲	▲	▲
San Diego (272)	▼	▲	▼	▼	▼	□	▨	□	▲	▲	▲	▲	▲
New York City (270)	▼	□	▼	▼	▼	□	□	▨	▲	▲	▲	▲	▲
Chicago (260)	▼	▼	▼	▼	▼	▼	▼	▼	▨	□	□	□	▲
Los Angeles (257)	▼	▼	▼	▼	▼	▼	▼	▼	□	▨	□	□	▲
Cleveland (257)	▼	▼	▼	▼	▼	▼	▼	▼	□	□	▨	□	▲
Atlanta (256)	▼	▼	▼	▼	▼	▼	▼	▼	□	□	□	▨	▲
District of Columbia (248)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▨

Figure 9. **Cross-district comparison of average scores for lower-income eighth-grade public school students in NAEP mathematics: 2007**

DISTRICT (Average score)	**Nation**	**Large central city**	Boston	Houston	Austin	New York City	Charlotte	San Diego	Chicago	Cleveland	Los Angeles	Atlanta	District of Columbia
Boston (271)	▲	▲	▨	□	▲	□	▲	▲	▲	▲	▲	▲	▲
Houston (268)	▲	▲	□	▨	□	□	□	▲	▲	▲	▲	▲	▲
Austin (267)	□	▲	▼	□	▨	□	□	□	▲	▲	▲	▲	▲
New York City (267)	□	▲	□	□	□	▨	□	□	▲	▲	▲	▲	▲
Charlotte (265)	□	▲	▼	□	□	□	▨	□	▲	▲	▲	▲	▲
San Diego (260)	□	□	▼	▼	□	□	□	▨	□	□	□	▲	▲
Chicago (257)	▼	▼	▼	▼	▼	▼	▼	□	▨	□	□	▲	▲
Cleveland (257)	▼	▼	▼	▼	▼	▼	▼	□	□	▨	□	▲	▲
Los Angeles (254)	▼	▼	▼	▼	▼	▼	▼	□	□	□	▨	□	▲
Atlanta (251)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	□	▨	▲
District of Columbia (243)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▨

▲	District had higher average scale score than the jurisdiction listed at the top of the column.
□	No statistically significant difference detected from the jurisdiction listed at the top of the column.
▼	District had lower average scale score than the jurisdiction listed at the top of the column.
▨	Comparison not made.

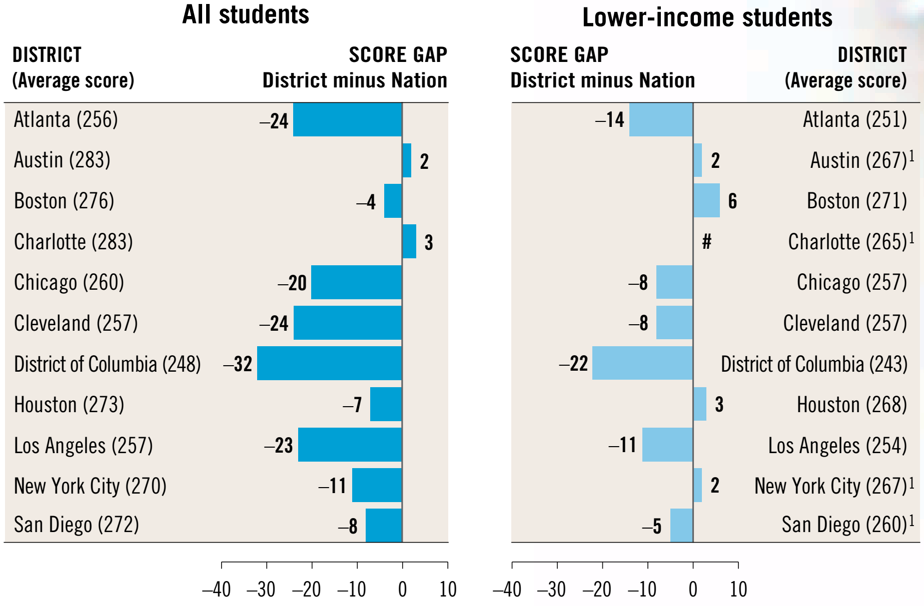
NOTE: The average score for all students in the nation was 280 and for students from lower-income families was 265. The average score for all students in large central cities was 269 and for students from lower-income families was 260. In NAEP, lower-income students are students identified as eligible for the National School Lunch Program.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

Nation – district gaps narrower for lower-income students

The size of the score gap between the performance of students in the districts and students nationally changes when looking at lower-income students only, as shown in figure 10. As discussed previously, most of the districts scored lower on average than the nation. The differences ranged from –4 to –32 points (shown by the bars on the left side of the figure). The average scores for Charlotte and Austin were higher than the score for the nation. These gaps in overall scores may be associated with the greater percentages of lower-income students in the districts, who usually have lower average performance in mathematics.

The right side of the figure shows the score gaps between lower-income students in the nation and in each district. The gaps between the nation and the districts for lower-income students are generally smaller than the gaps for all students. Using Chicago as an example, the district's average score was 20 points lower than the national average. Chicago's average score for lower-income students, however, was 8 points lower than the average for lower-income students nationally. For trend results of lower-income students in each district and their peers nationwide, see the section on individual districts later in this report.

Figure 10. **Average scores and score gaps between the nation and districts for all students and lower-income eighth-grade public school students in NAEP mathematics, by urban district: 2007**



Rounds to zero.

[1] The score-point difference between this district and the nation was not statistically significant.

NOTE: The average score for all students in the nation was 280 and for students from lower-income families was 265. In NAEP, lower-income students are students identified as eligible for the National School Lunch Program. Score gaps are calculated based on differences between unrounded average scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

Assessment Content at Grade 8

Of the 168 questions that made up the eighth-grade mathematics assessment, the largest percentage (approximately 30 percent) focused on algebra. The emphasis was on students' understanding of algebraic representations, patterns, and functions; linearity; and algebraic expressions, equations, and inequalities.

The knowledge and skills expected at grade 8 in number properties and operations include computing with rational numbers, common irrational numbers, and numbers in scientific notation, and using numbers to solve problems involving proportionality and rates.

In the measurement content area, students were expected to be familiar with area, volume, angles, and rates. In geometry, eighth-graders were expected to be familiar with parallel and perpendicular lines, angle relations in polygons, cross sections of solids, and the Pythagorean Theorem. In data analysis and probability, students were expected to use a variety of techniques for organizing and summarizing data, analyzing statistical claims, and demonstrating an understanding of the terminology and concepts of probability.

Mathematics Achievement Levels at Grade 8

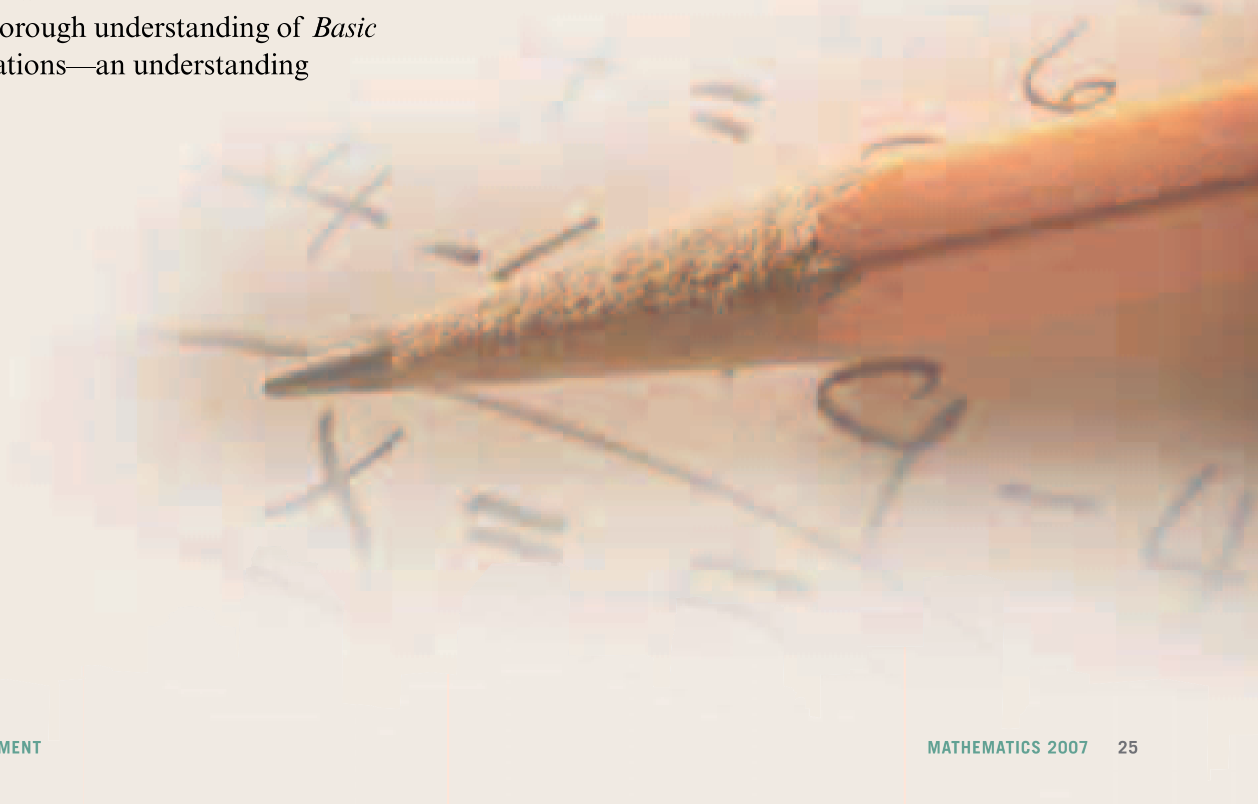
The following descriptions are abbreviated versions of the full achievement-level descriptions for grade 8 mathematics. The cut score depicting the lowest score representative of that level is noted in parentheses.

Basic (262): Eighth-graders performing at the *Basic* level should complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. They should be able to solve problems in all NAEP content areas through the appropriate selection and use of strategies and technological tools, including calculators, computers, and geometric shapes. Students at this level also should be able to use fundamental algebraic and informal geometric concepts in problem solving. As they approach the *Proficient* level, students at the *Basic* level should be able to determine which of the available data are necessary and sufficient for correct solutions and use them in problem solving. However, these eighth-graders show limited skill in communicating mathematically.

Proficient (299): Eighth-graders performing at the *Proficient* level should be able to conjecture, defend their ideas, and give supporting examples. They should understand the connections among fractions, percents, decimals, and other mathematical topics such as algebra and functions. Students at this level are expected to have a thorough understanding of *Basic* level arithmetic operations—an understanding sufficient for problem solving in practical situations. Quantity and spatial relationships in problem solving and reasoning should be familiar to them, and they should be able to convey underlying reasoning skills beyond the level of arithmetic. They should be able to compare and contrast mathematical ideas and generate their own examples. These students should make inferences from data and graphs, apply properties of informal geometry, and accurately use the tools of technology. Students at this level should understand the process of gathering and organizing data and be able to calculate, evaluate, and communicate results within the domain of statistics and probability.

Advanced (333): Eighth-graders performing at the *Advanced* level should be able to probe examples and counterexamples in order to shape generalizations from which they can develop models. Eighth-graders performing at the *Advanced* level should use number sense and geometric awareness to consider the reasonableness of an answer. They are expected to use abstract thinking to create unique problem-solving techniques and explain the reasoning processes underlying their conclusions.

The full descriptions can be found at http://www.nagb.org/frameworks/math_07.pdf.



Sample Question About Algebra

This sample question measures eighth-graders' performance in the algebra content area. It addresses the "Algebraic representations" subtopic, which focuses on analyzing, interpreting, and translating among different representations of linear relationships; representing points in a rectangular coordinate system; and recognizing common nonlinear relationships in meaningful contexts. The framework objective measured by this question is "Translate between different representations of linear expressions using symbols, graphs, tables, diagrams, or written descriptions." Students were permitted to use a calculator to solve this problem.

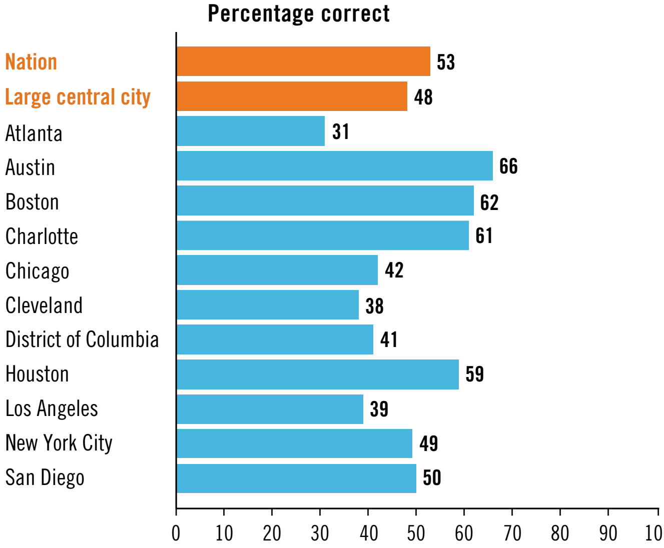
The correct response is choice B. The incorrect choice A resulted from interchanging the variables for the number of cards sold and the amount of profit. Incorrect choices C and D are alternate ways to represent the relationship between the number of cards sold and the profit on Monday, but they do not represent the relationship on the other days. Incorrect choice E can be obtained by interchanging the variables and considering only Thursday.

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Number Sold, n	4	0	5	2	3	6
Profit, p	\$2.00	\$0.00	\$2.50	\$1.00	\$1.50	\$3.00

Angela makes and sells special-occasion greeting cards. The table above shows the relationship between the number of cards sold and her profit. Based on the data in the table, which of the following equations shows how the number of cards sold and profit (in dollars) are related?

Ⓐ $p = 2n$ 🅑 $p = 0.5n$ Ⓒ $p = n - 2$ Ⓓ $p = 6 - n$ Ⓔ $p = n + 1$

Percentage correct for eighth-grade public school students in 2007, by jurisdiction



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

Fifty-three percent of eighth-grade public school students in the nation selected the correct answer. The percentage of correct responses in each of the districts ranged from 31 percent in Atlanta to 66 percent in Austin.

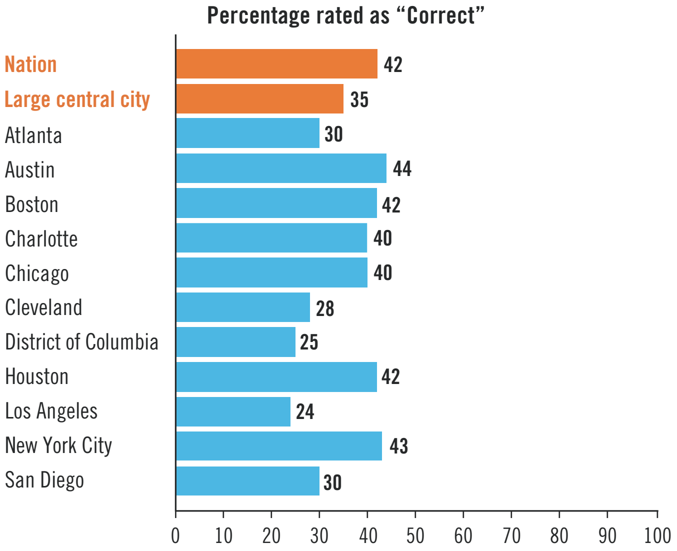
Sample Question About Number Properties and Operations

This sample question measures eighth-graders' understanding in the number properties and operations content area. It addresses the "Properties of numbers and operations" subtopic, which focuses on recognizing, describing, and explaining properties of integers and operations. The framework objective measured by this question is "Explain or justify a mathematical concept or relationship." Students were permitted to use a calculator to solve this problem.

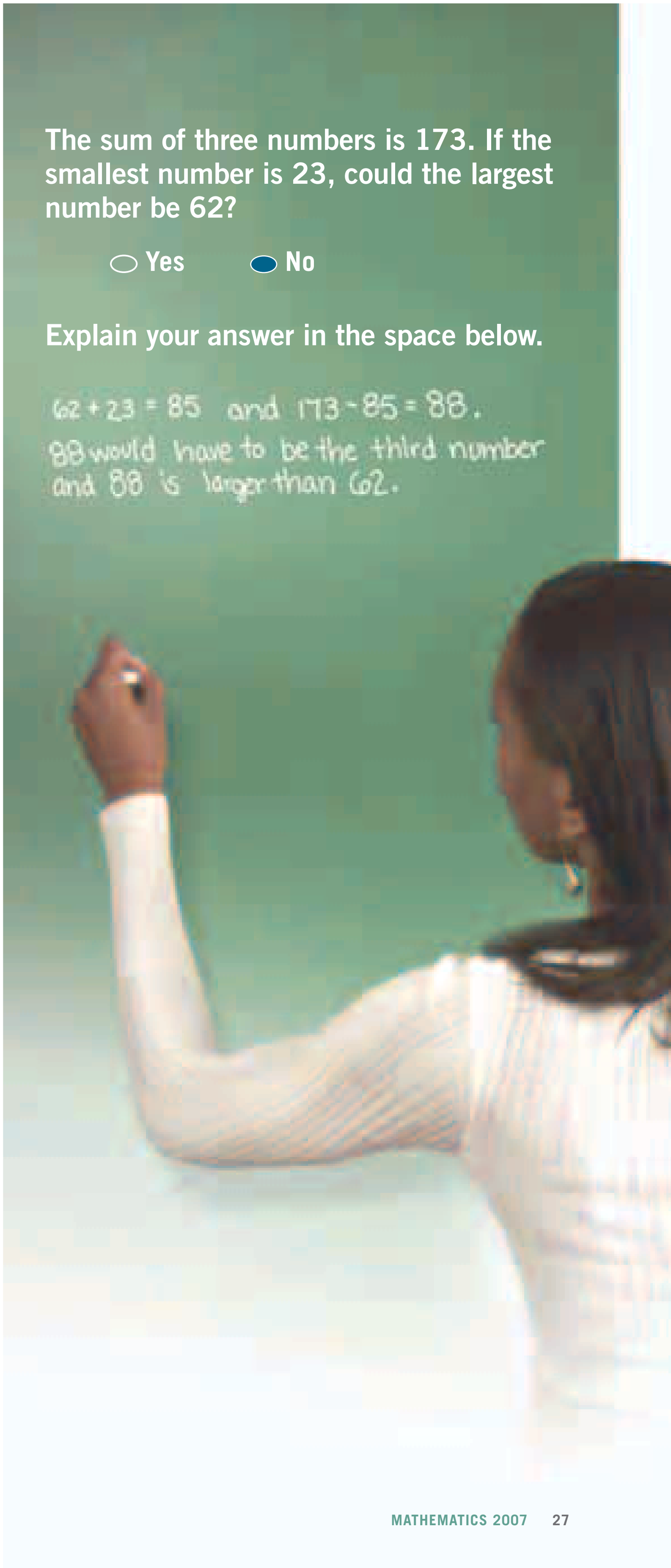
Student responses for this question were rated using a two-level scoring guide specifying "Correct" or "Incorrect." The student response shown here was rated as "Correct." It showed that if two of the three numbers are 23 and 62, then the third number must be 88. Therefore, 62 cannot be the largest of the three numbers.

Forty-two percent of eighth-grade public school students in the nation gave a response that was rated "Correct" for this question. The percentage of student responses rated as "Correct" in the districts ranged from 24 percent in Los Angeles to 44 percent in Austin.

Percentage rated as "Correct" for eighth-grade public school students in 2007, by jurisdiction



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.



The sum of three numbers is 173. If the smallest number is 23, could the largest number be 62?

○ Yes ● No

Explain your answer in the space below.

62 + 23 = 85 and 173 - 85 = 88.
88 would have to be the third number and 88 is larger than 62.

What Fourth-Graders Know and Can Do in Mathematics

The item map below is useful for understanding performance at different levels on the scale. The scale scores on the left represent the average scores for students who were likely to get the items correct. The lower-boundary scores at each achievement level are noted in boxes. The descriptions of selected assessment questions are listed on the right along with the corresponding mathematics content areas.

For example, the map on this page shows that fourth-graders performing in the middle of the *Basic* range (students with an average score of 225) were likely to be able to identify a fraction modeled by a picture. Students performing in the middle of the *Proficient* range (with an average score of 267) were likely to be able to explain how to find the perimeter of a given shape.

GRADE 4 NAEP MATHEMATICS ITEM MAP

	Scale score	Content area	Question description
Advanced	500		
	330	**Data analysis and probability**	Label sections in a spinner to satisfy a given condition
	318	**Number properties and operations**	*Add three fractions with like denominators*
	296	**Algebra**	*Relate input to output from a table of values*
	294	**Number properties and operations**	*Solve a story problem involving addition and subtraction* (shown on page 16)
	290	**Measurement**	*Find area of a square with inscribed triangle*
	289	**Geometry**	*Recognize the result of folding a given shape*
	287	**Data analysis and probability**	Identify color with highest chance of being chosen (shown on page 17)
	282		
Proficient	279	**Number properties and operations**	Solve a story problem requiring multiple operations
	279	**Data analysis and probability**	*Identify picture representing greatest probability*
	267	**Measurement**	Explain how to find the perimeter of a given shape
	264	**Number properties and operations**	*Solve a story problem involving money*
	263	**Algebra**	*Identify number that would be in a pattern*
	262	**Geometry**	*Determine the number of blocks used to build a figure*
	255	**Number properties and operations**	*Use place value to determine the amount of increase*
	250	**Geometry**	*Identify the 3-D shape resulting from folding paper*
	249	**Data analysis and probability**	*Determine probability of a specific outcome*
	249		
Basic	245	**Number properties and operations**	Recognize property of odd numbers
	243	**Number properties and operations**	Multiply two decimal numbers
	232	**Measurement**	*Determine attribute being measured from a picture*
	230	**Number properties and operations**	*Subtract a three-digit number from a four-digit number*
	227	**Algebra**	*Identify number sentence that models a balanced scale*
	225	**Number properties and operations**	*Identify a fraction modeled by a picture*
	220	**Algebra**	*Identify an expression that represents a scenario*
	218	**Number properties and operations**	*Find a sum based on place value*
	217	**Geometry**	*Identify congruent triangles*
	214		
	211	**Data analysis and probability**	Complete a bar graph
	205	**Geometry**	*Use reason to identify figure based on description*
	202	**Measurement**	*Identify appropriate unit for measuring length*
	202	**Number properties and operations**	*Identify place value representation of a number*
	191	**Algebra**	*Find unknown in whole number sentence*
	0		

NOTE: Regular type denotes a constructed-response question. *Italic* type denotes a multiple-choice question. The position of a question on the scale represents the average scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, or a 74 percent probability of correctly answering a four-option multiple-choice question. For constructed-response questions, the question description represents students' performance rated as completely correct. Scale score ranges for mathematics achievement levels are referenced on the map.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Mathematics Assessment.

What Eighth-Graders Know and Can Do in Mathematics

The item map below illustrates the range of mathematical knowledge and skills demonstrated by eighth-graders. For example, students performing near the middle of the *Basic* range (with an average score of 278) were likely to be able to estimate time given a rate and a distance. Students performing near the top of the *Proficient* range (with an average score of 325) were likely to be able to complete a table and write an algebraic expression.

GRADE 8 NAEP MATHEMATICS ITEM MAP

	Scale score	Content area	Question description
Advanced	500		
	364	**Geometry**	Model a geometrical situation given specific conditions
	355	**Measurement**	*Estimate side length of a square given area*
	342	**Algebra**	*Identify the graph of a linear equation*
	340	**Number properties and operations**	*Interpret a number expressed in scientific notation*
	337	**Geometry**	Find container height given dimensions of contents
	334	**Data analysis and probability**	Identify best method for selecting a sample
	333		
Proficient	329	**Algebra**	*Convert a temperature from Fahrenheit to Celsius*
	328	**Data analysis and probability**	*Identify which statistic is represented by a response*
	325	**Algebra**	Complete a table and write an algebraic expression
	320	**Number properties and operations**	*Determine distance given rate and time*
	317	**Number properties and operations**	Analyze a mathematical relationship (shown on page 27)
	314	**Algebra**	*Use a formula to solve a problem*
	311	**Number properties and operations**	*Divide large numbers in a given context*
	308	**Measurement**	Determine value of marks on a scale
	306	**Geometry**	*Determine measure of an angle in a figure*
	304	**Number properties and operations**	*Identify fractions listed in ascending order*
	301	**Algebra**	*Determine an equation relating sales and profit* (shown on page 26)
	299		
Basic	296	**Data analysis and probability**	*Identify relationship in a scatterplot*
	296	**Number properties and operations**	*Convert raw points to a percentage*
	287	**Data analysis and probability**	Explain which survey is better
	278	**Number properties and operations**	*Estimate time given a rate and a distance*
	276	**Algebra**	*Determine an expression to model a scenario*
	268	**Measurement**	*Determine width after proportional enlargement*
	265	**Algebra**	*Identify point on a graph with specified coordinates*
	262		
	261	**Algebra**	*Evaluate an expression for a specific value*
	259	**Data analysis and probability**	*Recognize misrepresented data*
	258	**Measurement**	*Determine dimensions that give the greatest volume*
	258	**Geometry**	*Identify the result of combining two shapes*
	257	**Algebra**	*Solve an algebraic equation*
	254	**Number properties and operations**	*Use place value to write a number*
	0		

NOTE: Regular type denotes a constructed-response question. *Italic* type denotes a multiple-choice question. The position of a question on the scale represents the average scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, a 74 percent probability of correctly answering a four-option multiple-choice question, or a 72 percent probability of correctly answering a five-option multiple-choice question. For constructed-response questions, the question description represents students' performance rated as completely correct. Scale score ranges for mathematics achievement levels are referenced on the map.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Mathematics Assessment.

A Closer Look at Individual Districts

To set the context for a closer look at individual districts, an understanding of the different socio-demographic characteristics of the districts is important when making comparisons to the nation and among the districts. Table 4 presents the socio-demographic characteristics of the participating districts at grade 4. Generally, the districts had higher percentages of minority (races other than White) students, lower-income students, and English language learners than the nation. The percentages of minority fourth-graders ranged from 64 percent to 94 percent in the participating districts, compared to 45 percent nationally in public schools. Further, the percentages of fourth-graders eligible for the National School Lunch Program, used as an indicator of poverty, ranged from 48 percent to 100 percent in the districts compared to 46 percent nationally.

Table 4. **Selected characteristics of fourth-grade public school students in NAEP mathematics, by jurisdiction: 2007**

Student characteristics	Nation	Large central city	Atlanta	Austin	Boston	Charlotte	Chicago	Cleveland	District of Columbia	Houston	Los Angeles	New York City	San Diego
Number of fourth-graders	3,441,000	546,000	4,000	6,000	4,000	10,000	30,000	4,000	5,000	15,000	54,000	67,000	10,000
Number of students assessed	189,800	36,800	1,500	1,900	1,300	1,700	2,300	1,100	1,900	2,800	2,700	2,500	1,700
Percentage of White students	55	20	12	26	12	36	10	20	6	6	9	17	23
Percentage of Black students	17	31	82	13	44	42	46	66	84	26	10	29	11
Percentage of Hispanic students	21	40	5	58	35	14	41	11	9	65	75	41	47
Percentage of Asian/Pacific Islander students	5	7	#	3	8	4	3	1	2	3	5	13	18
Percentage eligible for National School Lunch Program	46	71	77	61	82	48	86	100[1]	69	85	77	87	63
Percentage identified as students with disabilities	14	13	10	13	22	12	14	17	14	10	11	16	12
Percentage identified as English language learners	11	22	3	29	31	11	20	7	8	38	48	17	40

Rounds to zero.

[1] In Cleveland, all students were categorized as eligible for the National School Lunch Program.

NOTE: The number of fourth-graders is rounded to the nearest 1,000. The number of students assessed is rounded to the nearest 100. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. The race/ethnicity categories listed do not sum to 100 percent because the percentages for American Indian/Alaska Native and unclassified students are not shown.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

Table 5 presents the socio-demographic characteristics of the participating districts at grade 8. As with grade 4, the participating urban districts serve predominantly minority (races other than White) students, compared with public schools in the nation where 42 percent of eighth-graders belong to races other than White. Most urban districts, particularly those located in California and Texas, also educate a higher percentage of students identified as English language learners than do public schools in the nation. In addition, the percentages of students in the districts eligible for the National School Lunch Program, used as an indicator of poverty, ranged from 49 to 100 percent, compared to 41 percent nationally.

In the next section, profiles of selected NAEP results from the 2007 Trial Urban District Assessment in mathematics are presented for each participating district. The profiles present a closer look at some key trends for each district: comparison with its home state, comparison with the nation for lower-income students, trends for student groups by race/ethnicity, and trends in achievement levels.

Table 5. **Selected characteristics of eighth-grade public school students in NAEP mathematics, by jurisdiction: 2007**

Student characteristics	Nation	Large central city	Atlanta	Austin	Boston	Charlotte	Chicago	Cleveland	District of Columbia	Houston	Los Angeles	New York City	San Diego
Number of eighth-graders	3,553,000	536,000	3,000	5,000	4,000	9,000	25,000	4,000	5,000	13,000	53,000	70,000	9,000
Number of students assessed	147,300	27,200	900	1,500	1,100	1,300	1,700	1,100	1,800	1,900	2,000	2,000	1,300
Percentage of White students	58	23	4	31	17	34	11	15	3	9	8	15	23
Percentage of Black students	17	30	92	13	43	47	47	74	88	29	11	33	13
Percentage of Hispanic students	19	38	3	53	30	12	39	10	9	58	74	38	46
Percentage of Asian/Pacific Islander students	5	8	#	2	10	5	3	1	1	3	7	13	17
Percentage eligible for National School Lunch Program	41	65	80	54	69	49	84	100[1]	65	77	76	86	59
Percentage identified as students with disabilities	13	13	11	16	19	13	17	20	17	13	10	13	11
Percentage identified as English language learners	7	13	1	16	9	9	7	5	4	12	28	11	21

Rounds to zero.

[1] In Cleveland, all students were categorized as eligible for the National School Lunch Program.

NOTE: The number of eighth-graders is rounded to the nearest 1,000. The number of students assessed is rounded to the nearest 100. Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. The race/ethnicity categories listed do not sum to 100 percent because the percentages for American Indian/Alaska Native and unclassified students are not shown.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Trial Urban District Mathematics Assessment.

MORE INFORMATION ON THE 2007 TRIAL URBAN DISTRICT ASSESSMENT

For general information and results, see http://nationsreportcard.gov.

For an interactive database including student, teacher, and school variables for all participating districts, the nation, and large central city schools, see the NAEP Data Explorer at http://nces.ed.gov/nationsreportcard/nde/.

All released NAEP sample test questions with associated performance results by nation, state, and district are available at http://nces.ed.gov/nationsreportcard/itmrls/.