

Longitudinal/Cross-sectional Study of the Impact of *Mathematics in Context* on Student Performance

**Year 1 Student Performance on an Assessment Using NAEP and TIMSS Items
for Program Evaluation**
(Working Paper # 16)

David C. Webb, Thomas A. Romberg, Mary Shafer

University of Wisconsin-Madison

Webb, D. C., Romberg, T. A., & Shafer, M. C. (2001). *Year 1 student performance on an assessment using NAEP and TIMSS items for program evaluation. (Mathematics in Context Longitudinal/Cross-Sectional Study Working Paper No. 16)*. Madison, WI: Wisconsin Center for Education Research

The research reported in this paper was supported in part by the National Science Foundation #REC-9553889. The views expressed here are those of the authors and do not necessarily reflect the views of the funding agency. Also, this paper was prepared while the second author was a Spencer Fellow at the Center for Advanced Study in the Behavioral Sciences. The Spencer Foundation and the University of Wisconsin Graduate School provided additional support.

Research reports of the effectiveness of reform-based curriculum and instruction often point to student performance on the SAT (e.g., Peressini, 1996; Sallee, 1996; Webb & Dowling, 1996), various standardized tests (e.g., Fashola & Slavin, 1997), and clusters of National Assessment of Educational Progress (NAEP) mathematics items (e.g., Baek, Carpenter, Steinhorsdottir, & Strom, 1997; Silver & Lane, 1995; White, Gamoran, & Smithson, 1995.). Although student performance on such tests offers limited views of student understanding (Greeno, Pearson, & Schoenfeld, 1996), student performance on such tests is often used as evidence of a program's effectiveness.

Because of the political sway these tests hold, the External Assessment System (EAS) we created for the evaluation of student performance gains using a reform-based curriculum, *Mathematics in Context* (National Center for Research in Mathematical Sciences Education & Freudenthal Institute, 1998), relative to a representative national and international samples of students, made use of publicly released tasks from the 1992 NAEP, 1996 NAEP, and the TIMSS. The purpose of this report is to discuss findings from the pilot administration of this assessment of a longitudinal cross-sectional study of the impact of *Mathematics in Context* (Shafer & Webb, 1998) and the preliminary findings from subsequent administration of a revised version of the assessment to Grade 5, 6, and 7 students participating in the study in 1998 during the first year.

In the EAS, four instruments, one for each grade, were used to assess different aspects of students' knowledge and understanding of mathematics and to document the impact of variables related to curriculum and instruction on students' mathematics achievement. Each instrument contained items evenly divided among four strands: number, geometry and measurement, algebra and patterns, and statistics and probability. In order to examine growth over time, a selection of items of moderate difficulty were repeated on each assessment.

EAS Pilot Assessment. Five anchor items and three non-anchor items were chosen for each content strand, for a total of 32 items on each assessment. National 8th grade *p*-values (i.e., percentage of correct responses in the sample tested) were used to classify

items as easy, anchor, and difficult. The general difficulty level of each assessment was raised per increase in grade level by distributing easy, anchor, and difficult items in the manner described in Table 1. In the Grade 5 EAS, three easy items and five anchor items were selected for each of four strands. For each successive grade level, one easy item was replaced by a difficult item in each strand.

Table 1
Difficulty rating and number of items by grade-level exam, Pilot Assessment

| Rating | Mean <i>p</i> -value | Number of items | | | |
|-----------|-------------------------|-----------------|---------|---------|---------|
| | | Grade 5 | Grade 6 | Grade 7 | Grade 8 |
| Easy | 80 | 12 | 8 | 4 | 0 |
| Anchor | 60 | 20 | 20 | 20 | 20 |
| Difficult | 40 | 0 | 4 | 8 | 12 |

The criteria used to select the items was as follows:

- within each strand items should reflect a range of strand content (e.g., for the number strand —computation, number theory, number representations, proportions, percents, estimation, and so on);
- three items in each strand, non-anchor items, should increase in difficulty from 5th to 8th grade (see Table 1);
- the ratio of multiple choice items to constructed-response items should be similar to the NAEP and TIMSS (i.e., 70% multiple choice, 30% constructed-response or extended-response).

In spring 1997, 10 classes (265 students) in nine different schools participated in a pilot study of the EAS. Three of the nine schools served students from large urban school districts. Test conditions allowed for use of calculators, and students were given two class periods to complete the assessment. Students were asked to record beginning and ending times each day. Assessment items were

scored by three project assistants according to guidelines provided with the NAEP and TIMSS items. Project assistants later visited pilot sites to discuss results with teachers that participated in the pilot.

As shown in Table 2, mean pilot p -values were generally one standard deviation above mean national 8th grade p -values. Students from fifth through seventh grade had little difficulty in completing eighth-grade items.

Table 2
P-Value Means by Problem Difficulty Rating (National vs. Pilot Results)

| Item type | 5th grade | | 6th grade | | 7th grade | |
|-----------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| | National | Pilot (N=73) | National | Pilot (N=65) | National | Pilot (N=78) |
| Easy | 80.6 (8.0) | 87.7 (8.6) | 78.2 (7.4) | 92.6 (6.1) | 72.5 (3.9) | 84.2 (6.4) |
| Anchor | 60.7 (9.4) | 71.5 (11.8) | 62.5 (7.4) | 81.0 (12.1) | 60.8 (8.8) | 78.8 (12.0) |
| Difficult | N/A | N/A | 40.1 (10.3) | 63.8 (14.5) | 36.1 (9.9) | 51.4 (14.7) |
| Overall | 69.3 (13.3) | 78.4 (13.2) | 63.5 (14.3) | 81.3 (16.3) | 55.3 (15.6) | 71.3 (17.8) |

Note: Values are given as Mean (Std. Dev.)

Although students were given 90 minutes to complete the assessment, mean completion times for fifth, sixth and seventh grade assessments were 31, 27, and 40 minutes respectively.

Of particular interest to us was the relatively strong performance of the 5th grade students. Even when taking into account probable demographic differences between the sample of students tested in this pilot and the sample of students that were tested for the NAEP and the TIMSS, we did not expect our fifth-grade pilot sample to exceed the eighth-grade p -values. Because we were

designing the EAS for a longitudinal study, we had some concern that a ceiling effect might occur in the first year of administering the assessment.

Revision of the EAS. Given the results and our interest in following student performance on NAEP and TIMSS items over several years, each assessment was revised to reflect a new standard for selecting easy, anchor, and difficult items. Because the most difficult items on the NAEP and TIMSS were constructed- and extended-response items, more of these items were included in the anchor and difficult categories. The p -value for easy, anchor, and difficult items on the revised assessment was 64.0, 40.0, and 24.2, respectively, reflecting a decrease in mean p -value of approximately 20 %. To reduce the time needed to take the assessment, the number of non-anchor questions was reduced to 2 per strand, leaving a total of 28 items on each assessment.

Results from the Longitudinal/Cross-Sectional Study

Description of Research Sites. In May 1998, the revised EAS was administered to students in four districts. The sample of students taking the revised EAS was geographically, economically, and culturally diverse. District 1 is located in a small suburban region in the eastern part of the country. The district has a 45% minority student population with 30% African American students and 12% Hispanic students. Approximately 30-40% of the students are eligible for government-funded lunch programs. District 2, located in a large urban area in the southeastern United States, contains 251 elementary and middle schools and numerous high schools. The district student population is predominantly minority with 33% African American students and 52% Hispanic students. Over 50% of the students are eligible for government-funded lunch programs. District 3 is located in a suburban area of a large western state and is composed of four schools, each specializing in 3–4 grade levels. Study participants included all 5th through 7th grade mathematics classes in the district. The district student population was predominately White. District 4 is one of many districts located in a large urban area in the eastern part of the country. Grades 6–8 are contained in middle schools in which students have several subject-matter

teachers. Study participants are from one middle school in this district. The district student population is predominantly minority with 50% African American and 37% Hispanic students. Over 50% of the students are eligible for government-funded lunch programs.

EAS administration and scoring. The revised EAS was administered to the year 1 cohort of students participating in the longitudinal/cross-sectional study of Mathematics in Context following a common set of procedures similar in content to those used with the 1996 NAEP. The year 1 cohort included 25 fifth grade classes, 35 sixth grade classes, and 34 seventh grade classes with 594 students from three school districts at Grade 5 and from four school districts at Grades 6 and 7, with 742 students at Grade 6 and 711 students at Grade 7. Students were given only one class period to complete the assessment with the total minutes per class period ranging from 42 to 50 minutes. Students had the opportunity to use calculators and materials typically available for classroom assessments (e.g., ruler, protractor).

Students' responses were hand-scored by pairs of teachers and researchers participating in scoring institutes held at the Wisconsin Center for Education Research during the following summer and fall. Multiple choice items judged as correct or incorrect received scores of one or zero, respectively. Constructed-response items were scored in accordance with rubrics and guidelines included with NAEP and TIMSS items. Student responses to constructed-response items received scores ranging from one to zero based on partial credit scoring recommendations given in NAEP and TIMSS rubrics. Responses to all items were scored twice; a third scorer adjudicated any discrepancies in scores.

Results for Grade 5. In Table 3 summary results are provided for each class in District 1 with respect to the four content domains, item difficulty, and the class mean for the total assessment and percent correct. Tables 4 and 5 include the same data for Districts 2 and 3. In District 1, eight classes used *MiC* and two classes used a conventional text. In District 2 seven classes used *MiC* and two used conventional texts, and in District 3 all six classes used *MiC*. Overall the classes in District 1 performed better than those in Districts 2 and 3, and the classes in District 3 performed better on these items than those in District 2.

Table 3
EAS Summary for Grade 5, District 1

| Class | Strand | | | | | | | | Difficulty | | | | Overall | |
|-----------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|---------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | |
| Banneker-Greene | 2.84 | 41% | 2.16 | 31% | 2.68 | 38% | 2.35 | 34% | 3.89 | 49% | 5.72 | 29% | 10.0 | 36% |
| Beethoven-Kipling | 3.54 | 51% | 2.56 | 37% | 3.19 | 46% | 2.78 | 40% | 4.62 | 58% | 6.57 | 33% | 12.1 | 43% |
| Beethoven-LaSalle | 4.61 | 66% | 3.60 | 51% | 3.16 | 45% | 5.30 | 76% | 6.23 | 78% | 9.70 | 49% | 16.7 | 60% |
| Beethoven-Linne | 1.70 | 24% | 0.60 | 9% | 2.70 | 39% | 2.33 | 33% | 2.40 | 30% | 4.73 | 24% | 7.3 | 26% |
| Dewey-Hamilton | 2.75 | 39% | 1.83 | 26% | 1.65 | 24% | 2.01 | 29% | 3.50 | 44% | 4.24 | 21% | 8.2 | 29% |
| Dewey-Mitchell 1 | 3.56 | 51% | 2.09 | 30% | 2.94 | 42% | 3.86 | 55% | 4.71 | 59% | 7.21 | 36% | 12.4 | 44% |
| Dewey-Mitchell 2 | 1.71 | 24% | 1.79 | 26% | 1.47 | 21% | 1.58 | 23% | 2.79 | 35% | 3.29 | 16% | 6.6 | 23% |
| Dewey-Mitchell 3 | 1.17 | 17% | 1.28 | 18% | 1.83 | 26% | 1.46 | 21% | 1.94 | 24% | 3.57 | 18% | 5.7 | 20% |
| <i>—Conventional—</i> | | | | | | | | | | | | | | |
| River Forest-Fulton | 3.35 | 48% | 2.58 | 37% | 2.93 | 42% | 4.00 | 57% | 5.43 | 68% | 6.76 | 34% | 12.9 | 46% |
| Dewey-Kershaw | 2.41 | 34% | 1.57 | 22% | 2.30 | 33% | 2.92 | 42% | 3.70 | 46% | 5.08 | 25% | 9.2 | 33% |

A quick scan of these tables reveals the vast variability across classes in their performance by strand. In District 1 the percent of items answered correctly by strand varies from 17% to 66% for number, 9% to 51% for geometry, 21% to 46% for algebra, and 21% to 76% for statistics. Similarly, in District 1 the variation in the percent of all items answered correctly varies from 20% to 60% across classes. Since for both these examples the differences are across *MiC* and conventional classes, curriculum is not the primary factor

contributing to variation. Student background, the content students had an opportunity to learn, and the method of instruction must be considered to make an informed interpretation about the sources of this variation. Note that there is less between class variation in Districts 2 and 3. In District 2 the variation in the percent of items answered correctly varies from 27% to 39% across the all classes. In District 3 the variation in the percent of items answered correctly varies from 32% to 38% across all classes.

Table 4
EAS Summary for Grade 5, District 2

| Class | Strand | | | | | | | | Difficulty | | | | Overall | |
|-----------------------|--------|-----|----------|-----|---------|-----|------------|-----|------------|-----|--------|-----|---------|-----|
| | Number | | Geometry | | Algebra | | Statistics | | Easy | | Anchor | | | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | |
| Armstrong-Murphy | 1.47 | 21% | 0.58 | 8% | 1.28 | 18% | 1.43 | 20% | 1.88 | 23% | 2.63 | 13% | 8.6 | 31% |
| Armstrong-Nash | 1.94 | 28% | 1.23 | 18% | 1.88 | 27% | 1.68 | 24% | 2.96 | 37% | 3.51 | 18% | 8.5 | 30% |
| Ogden-Fiske 1 | 1.32 | 19% | 1.08 | 15% | 1.52 | 22% | 1.36 | 19% | 2.04 | 26% | 3.00 | 15% | 7.5 | 27% |
| Ogden-Fiske 2 | 2.20 | 31% | 0.85 | 12% | 2.45 | 35% | 1.38 | 20% | 2.80 | 35% | 3.83 | 19% | 7.4 | 27% |
| Ogden-Piccolo 1 | 1.62 | 23% | 1.38 | 20% | 1.85 | 26% | 1.54 | 22% | 2.42 | 30% | 3.54 | 18% | 8.7 | 31% |
| Ogden-Piccolo 2 | 1.48 | 21% | 1.30 | 19% | 1.64 | 23% | 1.67 | 24% | 1.86 | 23% | 3.85 | 19% | 7.5 | 27% |
| Ogden-Piccolo 3 | 2.36 | 34% | 1.60 | 23% | 2.00 | 29% | 2.53 | 36% | 2.88 | 36% | 5.17 | 26% | 11.0 | 39% |
| <i>—Conventional—</i> | | | | | | | | | | | | | | |
| Von Steuben-Gant 1 | 2.44 | 35% | 2.23 | 32% | 2.58 | 37% | 2.88 | 41% | 4.15 | 52% | 5.36 | 27% | 10.1 | 36% |
| Von Steuben-Gant 2 | 2.82 | 40% | 2.30 | 33% | 2.29 | 33% | 3.27 | 47% | 3.68 | 46% | 6.40 | 32% | 10.7 | 38% |

These data led us to conclude that some form of tracking of students has occurred in District 1, but not in Districts 2 and 3.

These data led us to examine differential emphasis on the content covered and method of instruction in the classes occurred within each district and whether the results were linked to differences in student background. The data confirm the expectation that performance on the “easy items” would be higher than on the “anchor items” on this assessment. It is also clear that the performance on the “anchor items” leaves plenty of room for growth, an important feature for the longitudinal aspect of the study.

Table 5
EAS Summary for Grade 5, District 3

| Class | Strand | | | | | | | | Difficulty | | | | | |
|----------------|----------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|----------------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| | — <i>MiC</i> — | | | | | | | | | | | | | |
| Taft-Allen | 2.75 | 39% | 1.72 | 25% | 2.50 | 36% | 2.59 | 37% | 4.17 | 52% | 4.84 | 24% | 9.6 | 34% |
| Taft-Cameron | 2.74 | 39% | 1.87 | 27% | 2.13 | 30% | 2.24 | 32% | 3.26 | 41% | 5.33 | 27% | 9.0 | 32% |
| Taft-Cooper | 2.05 | 29% | 1.41 | 20% | 2.09 | 30% | 2.29 | 33% | 3.41 | 43% | 4.20 | 21% | 9.2 | 33% |
| Taft-DeLaCruz | 2.98 | 43% | 1.95 | 28% | 2.33 | 33% | 3.35 | 48% | 4.29 | 54% | 5.75 | 29% | 10.6 | 38% |
| Taft-Dodge | 2.89 | 41% | 1.55 | 22% | 2.36 | 34% | 3.01 | 43% | 3.91 | 49% | 5.44 | 27% | 9.8 | 35% |
| Taft-Edgebrook | 2.90 | 41% | 2.25 | 32% | 2.58 | 37% | 2.66 | 38% | 4.17 | 52% | 5.81 | 29% | 10.4 | 37% |

Tables 6, 7, and 8 display EAS results for Districts 1, 2, and 3 by comparing class p -values for each item to national grade 8 p -values. Item comparisons were categorized as follows: class p -value is at most 10% below grade 8 national p -value, class p -value is within 10% of grade 8 national p -value, and class p -value is at least 10% higher than grade 8 national p -value (see appendix tables A, B, and C for class p -values for each item). These tables highlight performance differences between classes that may not appear in overall mean scores by removing the effect of very low and very high item scores on the overall mean.

In District 1, five classes – Beethoven-Kipling, Beethoven LaSalle, Dewey-Mitchell 1, River Forest-Fulton, and Dewey-Kershaw – had item p -values that were comparable to or greater than grade 8 national p -values for over half of the grade 5 EAS items.

Table 6
P-value comparison for Grade 5, District 1

| Class | Number of items class p -value is | | |
|-----------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| <i>—MiC—</i> | | | |
| Banneker-Greene | 16 | 11 | 1 |
| Beethoven-Kipling | 11 | 12 | 5 |
| Beethoven-LaSalle | 4 | 9 | 15 |
| Beethoven-Linne | 20 | 7 | 1 |
| Dewey-Hamilton | 21 | 3 | 4 |
| Dewey-Mitchell 1 | 10 | 13 | 5 |
| Dewey-Mitchell 2 | 23 | 4 | 1 |
| Dewey-Mitchell 3 | 24 | 4 | 0 |
| <i>—Conventional—</i> | | | |
| River Forest-Fulton | 10 | 12 | 6 |
| Dewey-Kershaw | 9 | 11 | 8 |

Tables 7 and 8 present similar data for classes in Districts 2 and 3. In District 2, two classes – Ogden-Piccolo 3 and Von Steuben-Gant 2 – had item p -values that were comparable or greater than grade 8 national p -values for over half of the grade 5 EAS items. In District 3, four classes – Cameron, DeLaCruz, Dodge, and Edgebrook – had item p -values that were comparable or greater than grade 8 national p -values for at least half of the grade 5 EAS items.

Table 7
P-value comparison for Grade 5, District 2

| Class | Number of items class p -value is | | |
|-----------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| <i>—MiC—</i> | | | |
| Armstrong-Murphy | 17 | 11 | 0 |
| Armstrong-Nash | 17 | 10 | 1 |
| Ogden-Fiske 1 | 21 | 7 | 0 |
| Ogden-Fiske 2 | 24 | 4 | 0 |
| Ogden-Piccolo 1 | 20 | 6 | 2 |
| Ogden-Piccolo 2 | 19 | 8 | 1 |
| Ogden-Piccolo 3 | 13 | 11 | 4 |
| <i>—Conventional—</i> | | | |
| Von Steuben-Gant 1 | 15 | 11 | 2 |
| Von Steuben-Gant 2 | 8 | 17 | 3 |

Table 8 also demonstrates how these tables provide a different representation of performance that is masked when comparing overall means. While there is less variance in District 3 on overall means, there are noteworthy differences in classroom performance. For example, Table 5 shows that the overall means for Cameron (32%) and Cooper (33%) are nearly equivalent. However, in Table 8, p -values for Cameron exceed grade 8 national p -values on nine items while p -values for Cooper exceed grade 8 national p -values on

only one item. In addition, for Cooper there were seven more items than Cameron that were at least 10% lower than grade 8 national p -values.

Table 8
P-value comparison for Grade 5, District 3

| Class | Number of items class p -value is | | |
|----------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| | — <i>MiC</i> — | | |
| Taft-Allen | 17 | 9 | 2 |
| Taft-Cameron | 8 | 11 | 9 |
| Taft-Cooper | 15 | 12 | 1 |
| Taft-DeLaCruz | 11 | 9 | 8 |
| Taft-Dodge | 14 | 11 | 3 |
| Taft-Edgebrook | 11 | 14 | 3 |

These tables confirm that some form of tracking of students has occurred in District 1, but not in Districts 2 and 3. These tables further demonstrate the variance that exists within each district. Both District 1 and District 2 have at least three classes in which p -values for 20 or more items are at least 10% less than the grade 8 national p -value. Table 6 confirms that Beethoven-LaSalle is an outlier among all grade 5 classes. On 15 of the 28 items their p -value is at least 10% higher than the corresponding grade 8 national p -value. Furthermore, related tables in the Appendix (see Tables A, B and C) reveal substantial variability across classes in their responses to specific items (e.g., in District 1 class p -values on item 1 vary from 0.0 to 61.3, and 5.6 to 96.8 on item 2). As these differences are across *MiC* and conventional classes, this confirms that the use of *MiC* is not the primary factor contributing to this variation.

Results for Grade 6. In Table 9 summary results are provided for each of 13 classes in District 1 with respect to the four content domains, item difficulty, and the class mean for the total assessment and percent correct. In nine of the classes *MiC* was being used; in the other four classes a conventional text was used. Tables 10, 11, and 12 present similar data for the classes in Districts 2, 3, and 4. In District 2 eight classes used *MiC* and two used conventional texts; in Districts 3 and 4 all classes used *MiC*.

Table 9
EAS Summary for Grade 6, District 1

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|----------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | |
| Fernwood MS-Weatherspoon 1 | 2.24 | 32% | 2.02 | 29% | 2.30 | 33% | 1.87 | 27% | 2.74 | 46% | 5.32 | 27% | 0.37 | 18% | 8.4 | 30% |
| Fernwood MS-Weatherspoon 2 | 2.08 | 30% | 2.08 | 30% | 1.30 | 19% | 2.25 | 32% | 2.70 | 45% | 4.67 | 23% | 0.53 | 26% | 7.9 | 28% |
| Fernwood MS-Weatherspoon 3 | 2.43 | 35% | 2.07 | 30% | 1.43 | 20% | 2.22 | 32% | 2.71 | 45% | 4.91 | 25% | 0.52 | 26% | 8.1 | 29% |
| Von Humboldt MS-Brown 1 | 2.05 | 29% | 1.35 | 19% | 1.50 | 21% | 1.50 | 21% | 2.40 | 40% | 3.55 | 18% | 0.45 | 23% | 6.4 | 23% |
| Von Humboldt MS-Brown 2 | 2.10 | 30% | 1.38 | 20% | 1.15 | 16% | 1.31 | 19% | 1.54 | 26% | 3.85 | 19% | 0.56 | 28% | 5.9 | 21% |
| Von Humboldt MS-Brown 3 | 2.58 | 37% | 1.48 | 21% | 1.41 | 20% | 1.77 | 25% | 2.15 | 36% | 4.49 | 22% | 0.60 | 30% | 7.2 | 26% |
| Von Humboldt MS-Harvey 1 | 2.01 | 29% | 1.50 | 21% | 2.17 | 31% | 1.89 | 27% | 2.13 | 35% | 5.08 | 25% | 0.36 | 18% | 7.6 | 27% |
| Von Humboldt MS-Harvey 2 | 2.21 | 32% | 1.59 | 23% | 2.35 | 34% | 2.03 | 29% | 2.48 | 41% | 5.42 | 27% | 0.27 | 14% | 8.2 | 29% |
| Von Humboldt MS-Harvey 3 | 2.24 | 32% | 1.76 | 25% | 2.62 | 37% | 1.93 | 28% | 3.10 | 52% | 5.22 | 26% | 0.24 | 12% | 8.6 | 31% |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | |
| Addams MS-Tallackson | 2.60 | 37% | 1.61 | 23% | 1.72 | 25% | 1.41 | 20% | 3.00 | 50% | 3.77 | 19% | 0.57 | 28% | 7.3 | 26% |
| Wacker MS-Krittendon 1 | 2.91 | 42% | 2.27 | 32% | 4.91 | 70% | 2.85 | 41% | 4.23 | 70% | 8.32 | 42% | 0.39 | 19% | 12.9 | 46% |
| Wacker MS-Krittendon 2 | 2.36 | 34% | 2.40 | 34% | 4.52 | 65% | 2.28 | 33% | 3.71 | 62% | 7.33 | 37% | 0.52 | 26% | 11.6 | 41% |
| Wacker MS-Krittendon 3 | 2.97 | 42% | 2.14 | 31% | 4.39 | 63% | 2.85 | 41% | 3.83 | 64% | 7.85 | 39% | 0.67 | 33% | 12.3 | 44% |

The across-district variation at grade 6 is not as great as it was in grade 5. Overall the classes in District 3 performed better than those in Districts 1, 2, and 4. As with the data for grade 5 a quick scan of these tables reveals the variability across classes in their performance by strand. In District 1, there is less variance among *MiC* classes than among the conventional classes. In District 1 there is greater variance in overall scores among schools than within schools. Most of the between-school variance is due to three conventional classes at Wacker Middle School. There is also greater variance across classes in the percent of algebra items answered

correctly than the other strands. The performance on the algebra items for the three conventional classes at Wacker Middle school in District 1 is exceptional. Algebra must have been emphasized in these classes. When comparing District 1 class results by strand, the range of percentage scores for number, geometry, and statistics is much smaller.

A different pattern of content coverage is apparent in Dillard 1 in Guggenheim Middle School in District 2. This class performed the highest in the district on all four content domains but particularly well on Number and Statistics.

Table 10
EAS Summary for Grade 6, District 2

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|-----------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | |
| Guggenheim MS-Broughton 1 | 1.53 | 22% | 1.58 | 23% | 1.68 | 24% | 2.52 | 36% | 1.89 | 32% | 4.95 | 25% | 0.47 | 24% | 7.3 | 26% |
| Guggenheim MS-Broughton 2 | 1.79 | 26% | 1.36 | 19% | 2.36 | 34% | 1.31 | 19% | 2.07 | 35% | 4.49 | 22% | 0.25 | 13% | 6.8 | 24% |
| Guggenheim MS-Dillard 1 | 3.87 | 55% | 3.11 | 44% | 2.91 | 42% | 3.33 | 48% | 4.70 | 78% | 7.74 | 39% | 0.78 | 39% | 13.2 | 47% |
| Guggenheim MS-Dillard 2 | 2.00 | 29% | 2.19 | 31% | 2.69 | 38% | 2.02 | 29% | 3.38 | 56% | 5.14 | 26% | 0.38 | 19% | 8.9 | 32% |
| Hirsch Metro MS-Davenport 1 | 2.09 | 30% | 1.86 | 27% | 2.41 | 34% | 2.38 | 34% | 3.00 | 50% | 5.10 | 26% | 0.50 | 25% | 8.7 | 31% |
| Hirsch Metro MS-Davenport 2 | 1.93 | 28% | 1.56 | 22% | 2.24 | 32% | 1.93 | 28% | 2.56 | 43% | 4.77 | 24% | 0.33 | 17% | 7.7 | 27% |
| Hirsch Metro MS-Holland 1 | 1.79 | 26% | 1.63 | 23% | 1.96 | 28% | 1.59 | 23% | 2.61 | 43% | 3.98 | 20% | 0.38 | 19% | 7.0 | 25% |
| Hirsch Metro MS-Holland 2 | 2.02 | 29% | 1.48 | 21% | 2.65 | 38% | 1.61 | 23% | 2.96 | 49% | 4.37 | 22% | 0.43 | 22% | 7.8 | 28% |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | |
| Newberry Middle MS-Renlund | 2.61 | 37% | 1.62 | 23% | 1.85 | 26% | 2.18 | 31% | 2.92 | 49% | 4.83 | 24% | 0.49 | 25% | 8.2 | 29% |
| Newberry Middle MS-Rhaney | 1.17 | 17% | 1.07 | 15% | 1.79 | 26% | 1.59 | 23% | 1.76 | 29% | 3.47 | 17% | 0.40 | 20% | 5.6 | 20% |

All *MiC* classes in District 3 have reasonably high scores except for Vetter, a special education class. Although these scores are low when compared to other classes within District 3, Vetter’s overall mean is comparable to at least one class in District 1 (Von Humbolt MS-Brown 2), District 2 (Newberry MS-Rhaney), and District 4 (Kelvin Park MS-Downer 2).

Table 11
EAS Summary for Grade 6, District 3

| Class | Strand | | | | | | | | Difficulty | | | | | | Overall | |
|------------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|---------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | |
| Calhoun North MS-Bragg 1 | 3.44 | 49% | 2.81 | 40% | 2.90 | 41% | 3.90 | 56% | 4.52 | 75% | 7.81 | 39% | 0.73 | 36% | 13.1 | 47% |
| Calhoun North MS-Bragg 2 | 2.96 | 42% | 2.12 | 30% | 2.62 | 37% | 3.03 | 43% | 3.57 | 60% | 6.60 | 33% | 0.56 | 28% | 10.7 | 38% |
| Calhoun North MS-Schlueter 1 | 2.89 | 41% | 2.09 | 30% | 2.68 | 38% | 2.36 | 34% | 3.59 | 60% | 5.77 | 29% | 0.66 | 33% | 10.0 | 36% |
| Calhoun North MS-Schlueter 2 | 3.45 | 49% | 2.95 | 42% | 3.15 | 45% | 3.73 | 53% | 4.60 | 77% | 8.01 | 40% | 0.68 | 34% | 13.3 | 47% |
| Calhoun North MS-Solomon 1 | 3.43 | 49% | 3.08 | 44% | 2.83 | 40% | 3.15 | 45% | 4.56 | 76% | 6.92 | 35% | 1.01 | 51% | 12.5 | 45% |
| Calhoun North MS-Solomon 2 | 3.11 | 44% | 2.52 | 36% | 2.62 | 37% | 3.30 | 47% | 4.24 | 71% | 6.65 | 33% | 0.65 | 33% | 11.5 | 41% |
| Calhoun North MS-Tierney | 3.60 | 51% | 3.23 | 46% | 3.46 | 49% | 4.32 | 62% | 4.67 | 78% | 9.09 | 45% | 0.85 | 43% | 14.6 | 52% |
| Calhoun North MS-Vetter | 1.32 | 19% | 0.71 | 10% | 1.71 | 24% | 1.86 | 27% | 2.14 | 36% | 2.93 | 15% | 0.54 | 27% | 5.6 | 20% |

In District 1, the three conventional classes at Wacker Middle School have an overall percent correct 10% to 15% higher than all other classes in District 1, but these three classes have comparable overall scores to all but the special education *MiC* class in District 3. The grade 6 *p*-values for classes in District 3 also all compare favorably with the grade 8 national *p*-values. With regard to content strands, most classes in District 3 did particularly well on Number and Statistics items. There is greater variance in Geometry and Statistics than in Number and Algebra. Since differences are across *MiC* classes the use of this program is not the primary factor contributing to this variation.

In District 4, class overall means are comparable to District 1 and 2 classes. The performance on the Number items for Vega 2 is exceptional. The next highest percentage in Number across all districts is 55% (see District 2: Guggenheim-Dillard 2). The overall mean for Downer 2 is the lowest for all grade 6 classes.

Table 12
EAS Summary for Grade 6, District 4

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|-------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| | <i>—MiC—</i> | | | | | | | | | | | | | | | |
| Kelvyn Park MS-Downer 1 | 1.82 | 26% | 2.17 | 31% | 2.13 | 30% | 2.28 | 33% | 3.58 | 60% | 4.36 | 22% | 0.45 | 22% | 8.4 | 30% |
| Kelvyn Park MS-Downer 2 | 1.79 | 26% | 0.79 | 11% | 1.25 | 18% | 1.31 | 19% | 1.50 | 25% | 3.08 | 15% | 0.56 | 28% | 5.1 | 18% |
| Kelvyn Park MS-Vega 1 | 2.77 | 40% | 1.65 | 24% | 1.69 | 24% | 2.77 | 40% | 3.23 | 54% | 5.07 | 25% | 0.58 | 29% | 8.9 | 32% |
| Kelvyn Park MS-Vega 2 | 5.43 | 78% | 2.00 | 29% | 3.06 | 44% | 2.66 | 38% | 4.50 | 75% | 8.28 | 41% | 0.38 | 19% | 10.9 | 39% |

Grade 6 data confirms that there was differential emphasis on the content covered in the classes within District 1, 3, and 4 (e.g., Algebra in District 1, Number and Statistics in District 3, and Number in District 4). These tables also confirm that some form of tracking students has occurred in District 2 and 4, but not in Districts 1 and 3. Furthermore, related tables in the Appendix (see Tables D, E, F and G) reveal substantial variability across classes in their responses to specific items (e.g., in District 1 class *p*-values on item 1 vary from 7.7 to 83.3, and 23.8 to 70.0 on item 2). As these differences are often across *MiC* classes, this confirms that the use of this program is not the primary factor contributing to this variation.

The data also confirm the expectation that performance on the “easy items” would be higher than on the “anchor items” on this assessment, and in turn higher than on the “difficult” items. It is also clear that the performance on the “anchor items” is in general higher in the grade 6 classes than for the grade 5, but not a lot better. Thus there is still plenty of room for growth, an important feature for the longitudinal aspect of the study.

Tables 13, 14, 15, and 16 show results for Districts 1, 2, 3 and 4 by comparing class p -values for each item to national grade 8 p -values. Item comparisons were categorized as follows: class p -value is at most 10% below grade 8 national p -value, class p -value is within 10% of grade 8 national p -value, and class p -value is at least 10% higher than grade 8 national p -value (see Appendix Tables D, E, F and G for class p -values for each item).

Table 13
P-value comparison for Grade 6, District 1

| Class | Number of items class p -value is | | |
|----------------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| <i>—MiC—</i> | | | |
| Fernwood MS-Weatherspoon 1 | 17 | 10 | 1 |
| Fernwood MS-Weatherspoon 2 | 20 | 7 | 1 |
| Fernwood MS-Weatherspoon 3 | 17 | 11 | 0 |
| Von Humboldt MS-Brown 1 | 20 | 6 | 2 |
| Von Humboldt MS-Brown 2 | 23 | 3 | 2 |
| Von Humboldt MS-Brown 3 | 19 | 9 | 0 |
| Von Humboldt MS-Harvey 1 | 18 | 8 | 2 |
| Von Humboldt MS-Harvey 2 | 17 | 11 | 0 |
| Von Humboldt MS-Harvey 3 | 19 | 8 | 1 |
| <i>—Conventional—</i> | | | |
| Addams MS-Tallackson | 21 | 5 | 2 |
| Wacker MS-Krittendon 1 | 9 | 10 | 9 |
| Wacker MS-Krittendon 2 | 8 | 14 | 6 |
| Wacker MS-Krittendon 3 | 6 | 16 | 6 |

Table 13 confirms differential performance in District 1 of the three classes at Wacker MS. When compared to other classes in District 1, the three classes at Wacker MS had at least twice as many item p -values that were comparable or greater than grade 8 national p -values than other grade 6, district 1 classes..

By inspection, table 14 confirms that Guggenheim-Dillard 1 is an outlier among all District 2 classes. Fewer items for Dillard 1 and Dillard 2 had class p -values that were at least 10% less than the grade 8 national p -value. Even though the overall means for Guggenheim-Dillard 2 and Hirsch Metro-Davenport 1 are almost the same (32% and 31%), there are some differences in their p -value comparisons. Also, p -value comparisons for the two conventional classes – Renlund and Rhaney – are identical to comparisons for Davenport 2 and Holland 1.

Table 14
P-value comparison for Grade 6, District 2

| Class | Number of items class p -value is | | |
|-----------------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| <i>—MiC—</i> | | | |
| Guggenheim MS-Broughton 1 | 17 | 10 | 1 |
| Guggenheim MS-Broughton 2 | 22 | 5 | 1 |
| Guggenheim MS-Dillard 1 | 3 | 15 | 10 |
| Guggenheim MS-Dillard 2 | 13 | 15 | 0 |
| Hirsch Metro MS-Davenport 1 | 17 | 9 | 2 |
| Hirsch Metro MS-Davenport 2 | 18 | 9 | 1 |
| Hirsch Metro MS-Holland 1 | 22 | 6 | 0 |
| Hirsch Metro MS-Holland 2 | 20 | 8 | 0 |
| <i>—Conventional—</i> | | | |
| Newberry Middle MS-Renlund | 18 | 9 | 1 |
| Newberry Middle MS-Rhaney | 22 | 6 | 0 |

Table 15 highlights differences in class performance for classes taught by the same teacher. Teachers in District 3 with two classes participating in the study – Bragg, Schlueter and Solomon – had one class that outperformed the other. It is unlikely that these differences are due to curriculum or instruction. Rather, it is more likely that these differences in class performance are associated with differences in student background. Also, the p -value comparison for Tierney is similar to the Guggenheim-Dillard 1, the outlier from District 2, and exceeds the performance of the Wacker MS classes in District 1.

Table 15
P-value comparison for Grade 6, District 3

| Class | Number of items class p -value is | | |
|------------------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| | —MiC— | | |
| Calhoun North MS-Bragg 1 | 8 | 9 | 11 |
| Calhoun North MS-Bragg 2 | 10 | 13 | 5 |
| Calhoun North MS-Schlueter 1 | 11 | 14 | 3 |
| Calhoun North MS-Schlueter 2 | 5 | 9 | 14 |
| Calhoun North MS-Solomon 1 | 9 | 9 | 10 |
| Calhoun North MS-Solomon 2 | 9 | 14 | 5 |
| Calhoun North MS-Tierney | 3 | 13 | 12 |
| Calhoun North MS-Vetter | 25 | 3 | 0 |

Table 16 also highlights differences in class performance for classes taught by the same teacher. Both District 4 teachers had two classes participating in the study. When combining the number of items where class p -values were comparable or greater than national p -values, each teacher had one class that outperformed the other. Again, it is unlikely that these differences are due to curriculum or instruction; they are probably associated with differences in student background. The p -value comparison for Vega 2 is similar to p -value comparisons for the Wacker MS classes in District 1. The p -value comparison for Downer 2 (which had the lowest overall mean among grade 6 classes in District 4) is similar to p -value comparisons for several District 1 and District 2 classes (e.g., Addams-Tallackson from District 1 and Guggenheim-Broughton 2 from District 2).

Table 16
P-value comparison for Grade 6, District 4

| Class | Number of items class p -value is | | |
|-------------------------|-------------------------------------|------------|---------|
| | Below — <i>MiC</i> — | Comparable | Greater |
| Kelvyn Park MS-Downer 1 | 18 | 8 | 2 |
| Kelvyn Park MS-Downer 2 | 22 | 5 | 1 |
| Kelvyn Park MS-Vega 1 | 13 | 11 | 4 |
| Kelvyn Park MS-Vega 2 | 8 | 15 | 5 |

Tables 13 through 16 confirm that some form of tracking of students has occurred in District 2 and 4, and possibly District 3. Since many of the differences in class performance are across *MiC* classes, the use of this program is not the primary factor contributing to variation. Since grade 6 teachers often teach more than one mathematics class, this data also provides an opportunity to investigate potential effects of teacher instruction. Tables 15 and 16 provide evidence that pupil background may be a factor in the organization of classes in Districts 3 and 4. However, if teachers are aware of differences in pupil background produced through institutionalized tracking, teachers may differentiate instruction according their perception of student ability (Oakes, 1985). Therefore, differences in pupil background are likely coupled with differences in teacher instruction.

In District 1, performance differences in the Wacker MS classes have been attributed to focus on algebra content. Since we have no other EAS data from other mathematics classes at Wacker MS, it is unclear if these three classes are the norm or produced by some form of tracking. In District 2, as noted earlier, Guggenheim-Dillard 1 is an outlier and is most likely the product of tracking at Guggenheim. However, the respectable performance of Guggenheim-Dillard 2 also suggests that student performance in Dillard’s classes cannot be entirely attributed to pupil background. The performance of both Dillard classes suggests teacher instructional effects as well.

Results from Grade 7. In Table 17 summary of EAS results are presented for each grade 7 class in District 1 with respect to the four content domains, item difficulty, and the class mean for the total assessment and percent correct.

Table 17
EAS Summary for Grade 7, District 1

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|---------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | |
| Fernwood MS-Heath 1 | 2.22 | 32% | 1.74 | 25% | 2.74 | 39% | 2.33 | 33% | 1.35 | 67% | 6.37 | 32% | 1.30 | 22% | 9.0 | 32% |
| Fernwood MS-Heath 2 | 2.25 | 32% | 1.76 | 25% | 2.89 | 41% | 2.14 | 31% | 1.47 | 74% | 6.37 | 32% | 1.20 | 20% | 9.0 | 32% |
| Von Humboldt MS-Donnely 1 | 2.06 | 29% | 1.50 | 21% | 2.72 | 39% | 2.61 | 37% | 1.00 | 50% | 6.76 | 34% | 1.13 | 19% | 8.9 | 32% |
| Von Humboldt MS-Donnely 2 | 1.77 | 25% | 1.50 | 21% | 2.48 | 35% | 1.98 | 28% | 0.90 | 45% | 5.97 | 30% | 0.85 | 14% | 7.7 | 28% |
| Von Humboldt MS-Donnely 3 | 2.27 | 32% | 1.50 | 21% | 2.50 | 36% | 2.23 | 32% | 1.25 | 63% | 6.04 | 30% | 1.20 | 20% | 8.5 | 30% |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | |
| Addams MS-St.James 1 | 2.89 | 41% | 2.21 | 32% | 2.57 | 37% | 3.18 | 45% | 1.43 | 71% | 7.93 | 40% | 1.50 | 25% | 10.9 | 39% |
| Addams MS-St.James 2 | 2.59 | 37% | 1.71 | 24% | 2.74 | 39% | 2.96 | 42% | 1.37 | 68% | 7.59 | 38% | 1.04 | 17% | 10.0 | 36% |
| Wacker MS-McLaughlin 1 | 2.00 | 29% | 1.48 | 21% | 2.45 | 35% | 2.10 | 30% | 1.35 | 68% | 5.68 | 28% | 0.99 | 17% | 8.0 | 29% |
| Wacker MS-McLaughlin 2 | 1.44 | 21% | 1.44 | 21% | 1.94 | 28% | 1.54 | 22% | 1.00 | 50% | 4.28 | 21% | 1.07 | 18% | 6.4 | 23% |
| Wacker MS-McLaughlin 3 | 2.28 | 33% | 1.20 | 17% | 2.60 | 37% | 2.73 | 39% | 1.50 | 75% | 6.22 | 31% | 1.09 | 18% | 8.8 | 31% |

Five of the classes in District 1 used *MiC* and the other five classes used a conventional text. Tables 18, 19, and 20 present similar data for grade 7 classes in Districts 2, 3, and 4. In District 2 eight classes used *MiC* and three used conventional texts; in Districts 3 and 4 all classes used *MiC*. The across-district variation at grade 7 is not as great as it was in grade 5.

Overall the classes in District 3 performed better than those in Districts 1, 2, and 4. As with the data for grade 5 a quick scan of these tables reveals the variability across classes in their performance by strand. In District 1, there is less variance within *MiC* classes than within conventional classes. Note the performance for the grade 7 classes at Wacker Middle School is considerably lower than the grade 6 classes on the same anchor items.

Table 18
EAS Summary for Grade 7, District 2

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|----------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|-----|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | |
| Guggenheim MS-Keeton 1 | 2.07 | 30% | 1.90 | 27% | 2.83 | 40% | 2.38 | 34% | 1.08 | 54% | 6.45 | 32% | 1.66 | 28% | 9.2 | 33% |
| Guggenheim MS-Keeton 2 | 1.95 | 28% | 1.80 | 26% | 2.74 | 39% | 2.68 | 38% | 1.39 | 70% | 6.36 | 32% | 1.42 | 24% | 9.2 | 33% |
| Guggenheim MS-Teague 1 | 2.25 | 32% | 1.72 | 25% | 2.12 | 30% | 1.88 | 27% | 1.24 | 62% | 5.85 | 29% | 0.88 | 15% | 8.0 | 28% |
| Guggenheim MS-Teague 2 | 2.38 | 34% | 1.57 | 22% | 2.13 | 30% | 1.85 | 26% | 1.00 | 50% | 5.77 | 29% | 1.16 | 19% | 7.9 | 28% |
| Hirsch Metro MS-Draski 1 | 3.03 | 43% | 2.21 | 32% | 2.23 | 32% | 2.34 | 33% | 0.96 | 48% | 7.12 | 36% | 1.73 | 29% | 9.8 | 35% |
| Hirsch Metro MS-Draski 2 | 2.04 | 29% | 2.10 | 30% | 1.67 | 24% | 1.82 | 26% | 1.25 | 63% | 5.41 | 27% | 0.96 | 16% | 7.6 | 27% |
| Hirsch Metro MS-McFadden 1 | 1.82 | 26% | 2.28 | 33% | 2.06 | 29% | 1.87 | 27% | 1.28 | 64% | 5.76 | 29% | 0.99 | 16% | 8.0 | 29% |
| Hirsch Metro MS-McFadden 2 | 1.96 | 28% | 1.67 | 24% | 2.21 | 32% | 1.48 | 21% | 1.17 | 58% | 4.91 | 25% | 1.24 | 21% | 7.3 | 26% |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | |
| Newberry MS-Cunningham 1 | 0.84 | 12% | 1.21 | 17% | 1.57 | 22% | 1.28 | 18% | 1.07 | 54% | 3.09 | 15% | 0.74 | 12% | 4.9 | 18% |
| Newberry MS-Cunningham 2 | 1.73 | 25% | 1.38 | 20% | 1.77 | 25% | 1.41 | 20% | 0.38 | 19% | 4.90 | 24% | 1.01 | 17% | 6.3 | 22% |
| Newberry MS-Stark 1 | 1.92 | 27% | 1.78 | 25% | 1.39 | 20% | 1.74 | 25% | 1.09 | 54% | 4.96 | 25% | 0.79 | 13% | 6.8 | 24% |

In District 2, there appears to be little variance in overall means by program and by teacher. With the exception of Draski 1, the strand means are relatively consistent for each teacher’s pair of classes. The pattern of algebra coverage in *MiC* is apparent in the *MiC* classes in District 2. There are no outlier classes in either District 1 or 2.

The pattern of overall means in District 3 for all the *MiC* classes is similar to grade 6. Six classes have reasonably high scores and one class at Calhoun North is very low. Schroeder represents a special education class with one student. Note six of the seven classes for District 3 have the same teacher. The means for Perry’s classes are consistently high across Number, Algebra and Statistics and slightly lower in Geometry. Overall, these six classes perform better on these items than the national samples.

Table 19
EAS Summary for Grade 7, District 3

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|----------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|---------|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | Percent |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | |
| Calhoun North MS-Perry 1 | 3.30 | 47% | 2.53 | 36% | 3.37 | 48% | 3.35 | 48% | 1.37 | 68% | 9.36 | 47% | 1.82 | 30% | 12.5 | 45% |
| Calhoun North MS-Perry 2 | 3.13 | 45% | 2.52 | 36% | 3.05 | 44% | 3.51 | 50% | 1.55 | 77% | 8.94 | 45% | 1.71 | 29% | 12.2 | 44% |
| Calhoun North MS-Perry 3 | 3.49 | 50% | 2.93 | 42% | 3.19 | 46% | 3.87 | 55% | 1.67 | 83% | 10.23 | 51% | 1.57 | 26% | 13.5 | 48% |
| Calhoun North MS-Perry 4 | 2.96 | 42% | 3.02 | 43% | 2.48 | 35% | 3.54 | 51% | 1.67 | 83% | 8.56 | 43% | 1.77 | 30% | 12.0 | 43% |
| Calhoun North MS-Perry 5 | 2.70 | 39% | 2.64 | 38% | 2.86 | 41% | 3.63 | 52% | 1.55 | 77% | 8.56 | 43% | 1.73 | 29% | 11.8 | 42% |
| Calhoun North MS-Perry 6 | 3.03 | 43% | 2.55 | 36% | 3.50 | 50% | 3.69 | 53% | 1.64 | 82% | 9.34 | 47% | 1.79 | 30% | 12.8 | 46% |
| Calhoun North MS-Schroeder | 2.25 | 32% | 1.00 | 14% | 1.00 | 14% | 1.33 | 19% | 1.00 | 50% | 4.33 | 22% | 0.25 | 4% | 5.6 | 20% |

Again, these data confirm that there was differential emphasis on the content covered in the classes within each district coupled with the differences in student background.

In District 4, classes generally performed better on Number and Statistics items. The low performance of both of Woodward’s classes may be attributed to insufficient time for students to complete the assessment (also see Table K). Class overall means for Finn and Yackle are comparable to District 1 and 2 classes.

Table 20
EAS Summary for Grade 7, District 4

| Class | Strand | | | | | | | | Difficulty | | | | | | | |
|---------------------------|---------------|-----|-----------------|-----|----------------|-----|-------------------|-----|-------------|-----|---------------|-----|------------------|-----|----------------|---------|
| | <u>Number</u> | | <u>Geometry</u> | | <u>Algebra</u> | | <u>Statistics</u> | | <u>Easy</u> | | <u>Anchor</u> | | <u>Difficult</u> | | <u>Overall</u> | |
| | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | % | Mean | Percent |
| | <i>—MiC—</i> | | | | | | | | | | | | | | | |
| Kelvyn Park MS-Finn 1 | 2.62 | 37% | 1.56 | 22% | 1.72 | 25% | 2.78 | 40% | 1.64 | 82% | 6.40 | 32% | 0.65 | 11% | 8.7 | 31% |
| Kelvyn Park MS-Finn 2 | 2.63 | 38% | 1.59 | 23% | 1.65 | 24% | 2.40 | 34% | 1.48 | 74% | 6.00 | 30% | 0.80 | 13% | 8.3 | 30% |
| Kelvyn Park MS-Woodward 1 | 1.90 | 27% | 1.05 | 15% | 1.45 | 21% | 2.18 | 31% | 0.95 | 48% | 5.02 | 25% | 0.62 | 10% | 6.6 | 24% |
| Kelvyn Park MS-Woodward 2 | 1.09 | 16% | 0.76 | 11% | 1.00 | 14% | 1.02 | 15% | 0.71 | 35% | 2.84 | 14% | 0.32 | 5% | 3.9 | 14% |
| Kelvyn Park MS-Yackle 1 | 3.00 | 43% | 2.42 | 35% | 2.00 | 29% | 2.96 | 42% | 1.50 | 75% | 7.53 | 38% | 1.34 | 22% | 10.4 | 37% |
| Kelvyn Park MS-Yackle 2 | 2.30 | 33% | 1.64 | 23% | 1.93 | 28% | 1.71 | 24% | 1.07 | 54% | 5.76 | 29% | 0.76 | 13% | 7.6 | 27% |

The data also confirms the expectation that performance on the “easy items” would be higher than on the “anchor items” on this assessment, and in turn higher than on the “difficult” items. It is also clear that the performance on the “anchor items” is in general higher in the grade 7 classes than in the grade 5 and 6 classes.

Tables 21, 22, 23, and 24 show results for Districts 1, 2, 3 and 4 by comparing class p -values for each item to national grade 8 p -values. Item comparisons were categorized as follows: class p -value is at most 10% below grade 8 national p -value, class p -value is within 10% of grade 8 national p -value, and class p -value is at least 10% higher than grade 8 national p -value (see Appendix Tables H, I, J and K for class p -values for each item).

Table 21
P-value comparison for Grade 7, District 1

| Class | Number of items class p -value is | | |
|---------------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| <i>—MiC—</i> | | | |
| Fernwood MS-Heath 1 | 13 | 12 | 3 |
| Fernwood MS-Heath 2 | 10 | 17 | 1 |
| Von Humboldt MS-Donnely 1 | 13 | 13 | 2 |
| Von Humboldt MS-Donnely 2 | 18 | 8 | 2 |
| Von Humboldt MS-Donnely 3 | 15 | 10 | 3 |
| <i>—Conventional—</i> | | | |
| Addams MS-St.James 1 | 9 | 13 | 6 |
| Addams MS-St.James 2 | 11 | 11 | 6 |
| Wacker MS-McLaughlin 1 | 14 | 11 | 3 |
| Wacker MS-McLaughlin 2 | 18 | 9 | 1 |
| Wacker MS-McLaughlin 3 | 12 | 11 | 5 |

Table 21 confirms similar performance of *MiC* and conventional classes in District 1, with the two classes at Addams MS performing slightly better than the rest of the District 1 classes. P -value comparisons by teacher are relatively consistent but Donnely and McLaughlin each have one class with slightly lower performance than their other classes.

Table 22 confirms that Hirsch Metro-Draski 1 outperformed other classes in District 2. Both Guggenheim-Keeton classes have identical p -values (33%) but their p -value comparisons are quite different. P -value comparisons for the conventional classes Cunningham 2 and Stark 1 are similar to p -value comparisons for several *MiC* classes in District 2. The low performance of Cunningham 1 is identical to Woodward 2 from District 4. However, since at least half the students in Cunningham 1 gave responses to all of the assessment items, time does not appear to be as much a factor for low performance in Cunningham 1 as it was for Woodward 2.

Table 22
P-value comparison for Grade 7, District 2

| Class | Number of items class p -value is | | |
|----------------------------|-------------------------------------|------------|---------|
| | Below | Comparable | Greater |
| <i>—MiC—</i> | | | |
| Guggenheim MS-Keeton 1 | 8 | 17 | 3 |
| Guggenheim MS-Keeton 2 | 15 | 8 | 5 |
| Guggenheim MS-Teague 1 | 16 | 10 | 2 |
| Guggenheim MS-Teague 2 | 15 | 12 | 1 |
| Hirsch Metro MS-Draski 1 | 9 | 12 | 7 |
| Hirsch Metro MS-Draski 2 | 13 | 14 | 1 |
| Hirsch Metro MS-McFadden 1 | 13 | 14 | 1 |
| Hirsch Metro MS-McFadden 2 | 15 | 13 | 0 |
| <i>—Conventional—</i> | | | |
| Newberry MS-Cunningham 1 | 24 | 4 | 0 |
| Newberry MS-Cunningham 2 | 18 | 8 | 2 |
| Newberry MS-Stark 1 | 17 | 10 | 1 |

Table 23 shows performance of *MiC* six classes for Perry. Perry 3 had more *p*-values that exceeded the grade 8 national *p*-values by more than 10%. Differences between Perry 3 and the other Perry classes are most likely associated with differences in student background.

Table 23
P-value comparison for Grade 7, District 3

| Class | Number of items class <i>p</i> -value is | | |
|----------------------------|--|------------|---------|
| | Below — <i>MiC</i> — | Comparable | Greater |
| Calhoun North MS-Perry 1 | 3 | 14 | 11 |
| Calhoun North MS-Perry 2 | 5 | 13 | 10 |
| Calhoun North MS-Perry 3 | 5 | 7 | 16 |
| Calhoun North MS-Perry 4 | 4 | 13 | 11 |
| Calhoun North MS-Perry 5 | 4 | 15 | 9 |
| Calhoun North MS-Perry 6 | 3 | 13 | 12 |
| Calhoun North MS-Schroeder | 21 | 2 | 5 |

Table 24 highlights differences in class performance for classes taught by the same teacher. The three District 4 teachers had two classes participating in the study. Both of Woodward classes appear to have lower performance than the other District 4 classes. Further analysis reveals that Woodward’s students did not respond to the last 6 questions due to limited time to complete the assessment.

Table 24
P-value comparison for Grade 7, District 4

| Class | Number of items class <i>p</i> -value is | | |
|---------------------------|--|------------|---------|
| | Below — <i>MiC</i> — | Comparable | Greater |
| Kelvyn Park MS-Finn 1 | 12 | 10 | 6 |
| Kelvyn Park MS-Finn 2 | 11 | 14 | 3 |
| Kelvyn Park MS-Woodward 1 | 18 | 9 | 1 |
| Kelvyn Park MS-Woodward 2 | 24 | 4 | 0 |
| Kelvyn Park MS-Yackle 1 | 7 | 14 | 7 |
| Kelvyn Park MS-Yackle 2 | 15 | 10 | 3 |

Summary

The External Assessment System was created for the evaluation of students’ knowledge and understanding of mathematics relative to representative national and international samples of students. Four instruments, one for each grade, were developed to assess different aspects of students’ understanding of mathematics. Each instrument contained 28 items evenly divided among four strands: number, geometry and measurement, algebra and patterns, and statistics and probability. In order to examine growth over time, 20 items of moderate difficulty were repeated on each assessment.

Data from the administration of the assessments developed for grades 5, 6, and 7 gathered in 1998 for the Longitudinal/Cross-Sectional Study indicate that this system will adequately serve the purpose of comparing class performance with that of representative national samples, and at the same time (via the use of an anchor set of items) be able to track the growth of students over time. It is encouraging to find that several classes even as low as grade 5 compare well with the national grade 8 sample. Also, as an example of using the EAS to demonstrate evidence of growth based on these items, in District 3 the cross-sectional comparison of six classes at grades 5, 6, and 7 show an increase in performance from 25.8% to 36.2% to 46% on the anchor items. However, this initial examination of the class performances shows considerable variability between classes within districts and across districts on the total scores, subscale scores for content and level of difficulty, and on specific items. To make reasonable inferences about the impact of *MiC* on class performance we will need to control for other sources of variability.

References

- Baek, J. M., Carpenter, S., Steinhorsdottir, O., & Strom, D. (1997). *Report for teachers: Spring 1997 MIMS assessments of mathematics reasoning*. Madison, WI: National Center for Improving Student Learning and Achievement in Mathematics and Science.
- Burstein, L., Koretz, D. M., Linn, R. L., Sugrue, B., Novak, J., Lewis, E., & Baker, E. L. (1993). *The validity of interpretations of the 1992 NAEP achievement levels in mathematics*. Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing.
- Fashola, O., & Slavin, R. (1997). Promising programs for elementary and middle schools: Evidence of effectiveness and replicability. *Journal of Education for Students Placed at Risk*, 2(3), 251-307.
- Graue, M. E., & Smith, S. Z. (1996). Parents and mathematics education reform. *Urban Education*, 30(4), 395–421.
- Greeno, J. G., Pearson, P. D., & Schoenfeld, A. H. (1996). *Implications for NAEP of research on learning and cognition*. Menlo Park, CA: Institute for Research on Learning.
- National Center for Research in Mathematical Sciences Education & Freudenthal Institute. (1997–1998). *Mathematics in context*. Chicago: Encyclopaedia Britannica.
- O'Neil, H. F., Jr., Sugrue, B., Abedi, J., Baker, E. L., & Golan, S. (1992). *Experimental studies on motivation and NAEP test performance. Final report. NAEP TRP Task 3a: Experimental motivation study*. Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing.
- Oakes, J. (1985). *Keeping Track: How schools structure inequality*. Yale University Press, New Haven, CT.
- Peressini, D. (1996). Parents, power, and the reform of mathematics education: an exploratory analysis of three urban high schools. *Urban Education*, 31(1), 3-28.
- Sallee, T. (1996, June). *Research results from the College Preparatory Mathematics High School Program*. Paper presented at the Fifth Conference on the Teaching of Mathematics, Baltimore, MD.

Shafer, M., & Webb, N. (1998). Studying the impact of reformed mathematics curricula. In S. B. Berenson, K. R. Dawkins, M. Blanton, W. Coulombe, J. Kolb, K. Norwood, & L. Stiff (Eds.), *Proceedings of the Twentieth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (vol. 2, pp. 521-526). Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education.

Silver, E. A., & Lane, S. (1995). Can instructional reform in urban middle schools help students narrow the mathematics performance gap? Some evidence from the QUASAR project. *Research in Middle Level Education*, 18(2), 49-70.

Webb, N. L., & Dowling, M. (1996). Impact of the interactive mathematics program on the retention of underrepresented students: Cross-school analysis of transcripts for the Class of 1993 for three high schools (Project Report 96-2). Madison, WI: Wisconsin Center for Education Research.

White, P., Gamoran, A., & Smithson, J. (1995). *Math innovations and student achievement in seven high schools in California and New York* (Unpublished manuscript). Madison, WI: Consortium for Policy Research in Education.

Appendix

Table A
P-values for Grade 5, District 1

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22a | 22b | 23 | 24a | 24b | 25 | 26 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Banneker-Greene 1 | 19 | 47.4 | 47.4 | 52.6 | 47.4 | 42.1 | 57.9 | 21.1 | 73.7 | 15.8 | 31.6 | 15.8 | 68.4 | 26.3 | 31.6 | 42.1 | 42.1 | 15.8 | 36.8 | 36.8 | 73.7 | 42.1 | 0.0 | 0.0 | 24.3 | 36.8 | 15.8 | 31.6 | 26.3 |
| Beethoven-Kipling 1 | 26 | 38.5 | 61.5 | 61.5 | 57.7 | 88.5 | 65.4 | 26.9 | 80.8 | 26.9 | 19.2 | 30.8 | 73.1 | 38.5 | 30.8 | 38.5 | 42.3 | 23.1 | 38.5 | 57.7 | 57.7 | 30.8 | 5.8 | 0.0 | 35.6 | 76.9 | 15.4 | 50.0 | 34.6 |
| Beethoven-LaSalle 1 | 31 | 61.3 | 96.8 | 87.1 | 80.6 | 74.2 | 93.5 | 61.3 | 90.3 | 29.0 | 41.9 | 83.9 | 87.1 | 71.0 | 29.0 | 16.1 | 83.9 | 74.2 | 25.8 | 54.8 | 96.8 | 64.5 | 27.4 | 14.5 | 52.3 | 77.4 | 35.5 | 29.0 | 29.0 |
| Beethoven-Linne 1 | 10 | 0.0 | 20.0 | 10.0 | 20.0 | 20.0 | 50.0 | 30.0 | 60.0 | 10.0 | 50.0 | 40.0 | 40.0 | 30.0 | 20.0 | 60.0 | 40.0 | 10.0 | 30.0 | 20.0 | 50.0 | 0.0 | 10.0 | 0.0 | 23.1 | 30.0 | 0.0 | 40.0 | 20.0 |
| Dewey-Hamilton 1 | 19 | 36.8 | 63.2 | 73.7 | 42.1 | 52.6 | 36.8 | 10.5 | 47.4 | 26.3 | 10.5 | 31.6 | 73.7 | 31.6 | 10.5 | 5.3 | 26.3 | 31.6 | 26.3 | 36.8 | 31.6 | 5.3 | 2.6 | 0.0 | 36.5 | 57.9 | 0.0 | 15.8 | 15.8 |
| Dewey-Mitchell 1 | 17 | 47.1 | 58.8 | 23.5 | 58.8 | 52.9 | 70.6 | 58.8 | 76.5 | 8.8 | 23.5 | 52.9 | 88.2 | 29.4 | 23.5 | 35.3 | 41.2 | 35.3 | 23.5 | 52.9 | 94.1 | 41.2 | 14.7 | 0.0 | 44.7 | 82.4 | 29.4 | 23.5 | 47.1 |
| Dewey-Mitchell 2 | 19 | 31.6 | 42.1 | 47.4 | 36.8 | 47.4 | 36.8 | 21.1 | 52.6 | 7.9 | 21.1 | 15.8 | 26.3 | 42.1 | 42.1 | 21.1 | 31.6 | 0.0 | 15.8 | 21.1 | 36.8 | 10.5 | 0.0 | 0.0 | 5.2 | 26.3 | 0.0 | 10.5 | 5.3 |
| Dewey-Mitchell 3 | 18 | 27.8 | 5.6 | 27.8 | 22.2 | 22.2 | 33.3 | 11.1 | 27.8 | 5.6 | 27.8 | 5.6 | 33.3 | 38.9 | 33.3 | 33.3 | 22.2 | 11.1 | 27.8 | 11.1 | 27.8 | 16.7 | 0.0 | 0.0 | 18.3 | 50.0 | 0.0 | 16.7 | 16.7 |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dewey-Kershaw 1 | 23 | 47.8 | 73.9 | 56.5 | 56.5 | 65.2 | 69.6 | 69.6 | 95.7 | 17.4 | 4.3 | 43.5 | 73.9 | 65.2 | 21.7 | 30.4 | 52.2 | 21.7 | 8.7 | 39.1 | 56.5 | 21.7 | 2.2 | 0.0 | 43.1 | 73.9 | 39.1 | 43.5 | 13.0 |
| River Forest-Fulton 1 | 30 | 60.0 | 56.7 | 83.3 | 70.0 | 66.7 | 80.0 | 40.0 | 96.7 | 18.3 | 33.3 | 53.3 | 66.7 | 63.3 | 23.3 | 20.0 | 46.7 | 30.0 | 30.0 | 33.3 | 83.3 | 20.0 | 5.0 | 0.0 | 49.7 | 73.3 | 10.0 | 30.0 | 43.3 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | G | N | G | N | G | S | S | A | N | A | S | N | S | G | A | N | S | A | N | S | G | G | G | S | A | A | A | N |
| Difficulty ^b | - | A | E | E | E | E | E | E | E | A | A | A | A | A | A | A | A | A | A | A | E | A | A | A | A | E | A | A | A |
| Source ^c | - | T | N92 | N92 | T | T | N92 | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | T | N92 | T | N92 | T | T | N96 | T | T | T | N96 |
| Source Reference ^d | - | L8 | E6 | C14 | Q5 | J17 | E9 | K7 | K1 | L5 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | I8 | K4 | N18 | O14 | U2a | U2b | L9 | S1a | S1b | O7 | C5 |
| Grade 8 <i>p</i> -value | - | 53.0 | 63.8 | 54.6 | 62.0 | 61.0 | 59.1 | 53.0 | 72.3 | 11.2 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 41.0 | 30.6 | 74.0 | 32.3 | 16.0 | 10.0 | 25.5 | 75.0 | 25.0 | 73.0 | 37.7 |

^a N = Number
G = Geometry & Measurement
A = Algebra
S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
A = Anchor [40.0]

^c T = Third International Mathematics and Science Study
N92 = 1992 National Assessment of Educational Progress
N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table B
P-values for Grade 5, District 2

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22a | 22b | 23 | 24a | 24b | 25 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Armstrong-Murphy 1 | 32 | 34.4 | 62.5 | 15.6 | 56.3 | 43.8 | 50.0 | 43.8 | 62.5 | 6.3 | 25.0 | 28.1 | 53.1 | 28.1 | 21.9 | 28.1 | 25.0 | 18.8 | 25.0 | 34.4 | 40.6 | 12.5 | 1.6 | 0.0 | 20.6 | 53.1 | 3.1 | 46.9 |
| Armstrong-Nash 1 | 23 | 26.1 | 60.9 | 39.1 | 30.4 | 30.4 | 34.8 | 39.1 | 69.6 | 15.2 | 13.0 | 13.0 | 47.8 | 13.0 | 21.7 | 43.5 | 43.5 | 17.4 | 17.4 | 21.7 | 73.9 | 34.8 | 2.2 | 2.2 | 25.8 | 65.2 | 8.7 | 21.7 |
| Ogden-Fiske 1 | 25 | 44.0 | 40.0 | 20.0 | 32.0 | 28.0 | 36.0 | 20.0 | 44.0 | 4.0 | 28.0 | 8.0 | 48.0 | 32.0 | 28.0 | 24.0 | 28.0 | 32.0 | 16.0 | 24.0 | 44.0 | 16.0 | 10.0 | 2.0 | 21.1 | 68.0 | 12.0 | 28.0 |
| Ogden-Fiske 2 | 19 | 26.3 | 36.8 | 36.8 | 47.4 | 26.3 | 31.6 | 21.1 | 47.4 | 5.3 | 26.3 | 10.5 | 47.4 | 21.1 | 5.3 | 26.3 | 47.4 | 10.5 | 26.3 | 26.3 | 42.1 | 5.3 | 0.0 | 0.0 | 12.2 | 52.6 | 15.8 | 52.6 |
| Ogden-Piccolo 1 | 26 | 26.9 | 38.5 | 53.8 | 30.8 | 50.0 | 38.5 | 30.8 | 53.8 | 3.8 | 38.5 | 30.8 | 34.6 | 19.2 | 15.4 | 50.0 | 30.8 | 11.5 | 34.6 | 46.2 | 42.3 | 30.8 | 3.8 | 0.0 | 20.3 | 65.4 | 7.7 | 34.6 |
| Ogden-Piccolo 2 | 22 | 45.5 | 18.2 | 22.7 | 22.7 | 45.5 | 36.4 | 18.2 | 45.5 | 6.8 | 31.8 | 22.7 | 68.2 | 50.0 | 22.7 | 36.4 | 22.7 | 31.8 | 13.6 | 40.9 | 27.3 | 27.3 | 2.3 | 0.0 | 21.0 | 54.5 | 0.0 | 22.7 |
| Ogden-Piccolo 3 | 25 | 40.0 | 48.0 | 28.0 | 36.0 | 60.0 | 68.0 | 60.0 | 56.0 | 16.0 | 32.0 | 36.0 | 64.0 | 28.0 | 20.0 | 48.0 | 44.0 | 32.0 | 32.0 | 52.0 | 76.0 | 48.0 | 0.0 | 0.0 | 27.8 | 64.0 | 20.0 | 32.0 |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Von Steuben-Gant 1 | 33 | 33.3 | 63.6 | 66.7 | 39.4 | 60.6 | 39.4 | 42.4 | 78.8 | 10.6 | 24.2 | 36.4 | 45.5 | 48.5 | 21.2 | 39.4 | 36.4 | 27.3 | 15.2 | 27.3 | 69.7 | 36.4 | 4.5 | 0.0 | 24.0 | 57.6 | 15.2 | 27.3 |
| Von Steuben-Gant 2 | 28 | 28.6 | 64.3 | 67.9 | 35.7 | 60.7 | 57.1 | 53.6 | 71.4 | 21.4 | 57.1 | 42.9 | 67.9 | 53.6 | 25.0 | 28.6 | 25.0 | 39.3 | 14.3 | 42.9 | 57.1 | 46.4 | 3.6 | 1.8 | 23.6 | 21.4 | 17.9 | 17.9 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | G | N | G | N | G | S | S | A | N | A | S | N | S | G | A | N | S | A | N | S | G | G | G | S | A | A | A |
| Difficulty ^b | - | A | E | E | E | E | E | E | E | A | A | A | A | A | A | A | A | A | A | A | E | A | A | A | A | E | A | A |
| Source ^c | - | T | N92 | N92 | T | T | N92 | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | T | N92 | T | N92 | T | T | N96 | T | T | T |
| Source Reference ^d | - | L8 | E6 | C14 | Q5 | J17 | E9 | K7 | K1 | L5 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | I8 | K4 | N18 | O14 | U2a | U2b | L9 | S1a | S1b | O7 |
| Grade 8 <i>p</i> -value | - | 53.0 | 63.8 | 54.6 | 62.0 | 61.0 | 59.1 | 53.0 | 72.3 | 11.2 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 41.0 | 30.6 | 74.0 | 32.3 | 16.0 | 10.0 | 25.5 | 75.0 | 25.0 | 73.0 |

- ^a N = Number
 G = Geometry & Measurement
 A = Algebra
 S = Statistics & Probability
- ^b E = Easy [mean grade 8 item *p*-value 64.0]
 A = Anchor [40.0]
- ^c T = Third International Mathematics and Science Study
 N92 = 1992 National Assessment of Educational Progress
 N96 = 1996 National Assessment of Educational Progress
- ^d Block and item number as referenced by producer of assessment.

Table C
P-values for Grade 5, District 3

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22a | 22b | 23 | 24a | 24b | 25 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Taft-Allen 1 | 18 | 11.1 | 50.0 | 55.6 | 55.6 | 50.0 | 44.4 | 22.2 | 72.2 | 25.0 | 33.3 | 38.9 | 61.1 | 38.9 | 38.9 | 27.8 | 33.3 | 11.1 | 16.7 | 16.7 | 72.2 | 11.1 | 0.0 | 0.0 | 25.7 | 61.1 | 11.1 | 33.3 |
| Taft-Cameron 1 | 23 | 34.8 | 78.3 | 65.2 | 65.2 | 56.5 | 47.8 | 56.5 | 87.0 | 23.9 | 26.1 | 26.1 | 69.6 | 65.2 | 26.1 | 30.4 | 65.2 | 34.8 | 39.1 | 56.5 | 56.5 | 47.8 | 23.9 | 4.3 | 43.1 | 60.9 | 4.3 | 34.8 |
| Taft-Cooper 1 | 22 | 22.7 | 45.5 | 54.5 | 59.1 | 27.3 | 68.2 | 31.8 | 50.0 | 15.9 | 27.3 | 22.7 | 54.5 | 31.8 | 27.3 | 13.6 | 9.1 | 31.8 | 22.7 | 50.0 | 50.0 | 31.8 | 11.4 | 2.3 | 24.0 | 72.7 | 9.1 | 45.5 |
| Taft-DeLaCruz 1 | 21 | 38.1 | 66.7 | 52.4 | 61.9 | 57.1 | 71.4 | 42.9 | 38.1 | 16.7 | 14.3 | 47.6 | 57.1 | 66.7 | 0.0 | 14.3 | 71.4 | 23.8 | 28.6 | 42.9 | 66.7 | 19.0 | 26.2 | 7.1 | 41.0 | 95.2 | 42.9 | 9.5 |
| Taft-Dodge 1 | 22 | 27.3 | 59.1 | 31.8 | 81.8 | 50.0 | 59.1 | 54.5 | 63.6 | 15.9 | 9.1 | 50.0 | 45.5 | 36.4 | 31.8 | 22.7 | 27.3 | 31.8 | 18.2 | 45.5 | 31.8 | 13.6 | 9.1 | 4.5 | 48.1 | 77.3 | 13.6 | 45.5 |
| Taft-Edgebrook 1 | 23 | 43.5 | 65.2 | 47.8 | 82.6 | 52.2 | 65.2 | 56.5 | 65.2 | 15.2 | 52.2 | 26.1 | 47.8 | 56.5 | 34.8 | 17.4 | 52.2 | 17.4 | 30.4 | 52.2 | 60.9 | 56.5 | 10.9 | 2.2 | 31.7 | 78.3 | 13.0 | 30.4 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | G | N | G | N | G | S | S | A | N | A | S | N | S | G | A | N | S | A | N | S | G | G | G | S | A | A | A |
| Difficulty ^b | - | A | E | E | E | E | E | E | A | A | A | A | A | A | A | A | A | A | A | A | E | A | A | A | A | E | A | A |
| Source ^c | - | T | N92 | N92 | T | T | N92 | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | T | N92 | T | N92 | T | T | N96 | T | T | T |
| Source Reference ^d | - | L8 | E6 | C14 | Q5 | J17 | E9 | K7 | K1 | L5 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | I8 | K4 | N18 | O14 | U2a | U2b | L9 | S1a | S1b | O7 |
| Grade 8 <i>p</i> -value | - | 53.0 | 63.8 | 54.6 | 62.0 | 61.0 | 59.1 | 53.0 | 72.3 | 11.2 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 41.0 | 30.6 | 74.0 | 32.3 | 16.0 | 10.0 | 25.5 | 75.0 | 25.0 | 73.0 |

^a N = Number

G = Geometry & Measurement

A = Algebra

S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]

A = Anchor [40.0]

^c T = Third International Mathematics and Science Study

N92 = 1992 National Assessment of Educational Progress

N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table D
P-values for Grade 6, District 1

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25a | 25b | 26 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fernwood MS-Weatherspoon 1 | 23 | 17.4 | 43.5 | 56.5 | 56.5 | 52.2 | 39.1 | 8.7 | 28.3 | 21.7 | 13.0 | 39.1 | 13.0 | 34.8 | 30.4 | 52.2 | 21.7 | 4.3 | 43.5 | 43.5 | 21.7 | 56.5 | 43.5 | 26.1 | 47.8 | 8.7 | 2.2 | 0.0 | 17.2 |
| Fernwood MS-Weatherspoon 2 | 20 | 35.0 | 70.0 | 45.0 | 55.0 | 45.0 | 40.0 | 30.0 | 22.5 | 10.0 | 35.0 | 55.0 | 35.0 | 30.0 | 20.0 | 30.0 | 25.0 | 10.0 | 15.0 | 40.0 | 20.0 | 40.0 | 20.0 | 20.0 | 35.0 | 0.0 | 2.5 | 0.0 | 5.0 |
| Fernwood MS-Weatherspoon 3 | 21 | 61.9 | 38.1 | 57.1 | 42.9 | 42.9 | 33.3 | 23.8 | 28.6 | 9.5 | 19.0 | 52.4 | 52.4 | 38.1 | 14.3 | 47.6 | 33.3 | 0.0 | 19.0 | 52.4 | 14.3 | 38.1 | 28.6 | 14.3 | 33.3 | 0.0 | 4.8 | 2.4 | 12.6 |
| Von Humboldt MS-Brown 1 | 20 | 55.0 | 55.0 | 35.0 | 65.0 | 60.0 | 50.0 | 20.0 | 25.0 | 10.0 | 30.0 | 35.0 | 15.0 | 25.0 | 30.0 | 30.0 | 10.0 | 0.0 | 10.0 | 15.0 | 5.0 | 10.0 | 20.0 | 5.0 | 25.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Von Humboldt MS-Brown 2 | 13 | 7.7 | 38.5 | 38.5 | 30.8 | 38.5 | 53.8 | 15.4 | 40.4 | 0.0 | 30.8 | 46.2 | 38.5 | 7.7 | 23.1 | 38.5 | 0.0 | 0.0 | 23.1 | 30.8 | 23.1 | 15.4 | 23.1 | 15.4 | 15.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Von Humboldt MS-Brown 3 | 27 | 48.1 | 37.0 | 51.9 | 37.0 | 51.9 | 44.4 | 29.6 | 30.6 | 18.5 | 33.3 | 63.0 | 29.6 | 29.6 | 40.7 | 40.7 | 29.6 | 5.6 | 25.9 | 14.8 | 14.8 | 14.8 | 11.1 | 7.4 | 11.1 | 0.0 | 0.0 | 0.0 | 2.4 |
| Von Humboldt MS-Harvey 1 | 24 | 29.2 | 25.0 | 37.5 | 54.2 | 25.0 | 16.7 | 16.7 | 19.8 | 25.0 | 8.3 | 54.2 | 45.8 | 41.7 | 45.8 | 50.0 | 16.7 | 2.1 | 29.2 | 37.5 | 8.3 | 33.3 | 33.3 | 25.0 | 62.5 | 0.0 | 0.0 | 0.0 | 13.8 |
| Von Humboldt MS-Harvey 2 | 23 | 43.5 | 43.5 | 43.5 | 47.8 | 43.5 | 34.8 | 13.0 | 14.1 | 30.4 | 21.7 | 47.8 | 47.8 | 30.4 | 30.4 | 47.8 | 26.1 | 2.2 | 30.4 | 26.1 | 13.0 | 30.4 | 39.1 | 47.8 | 43.5 | 0.0 | 2.2 | 0.0 | 15.8 |
| Von Humboldt MS-Harvey 3 | 21 | 47.6 | 42.9 | 42.9 | 38.1 | 71.4 | 14.3 | 0.0 | 23.8 | 19.0 | 28.6 | 52.4 | 28.6 | 14.3 | 28.6 | 23.8 | 38.1 | 14.3 | 47.6 | 47.6 | 23.8 | 42.9 | 42.9 | 23.8 | 61.9 | 14.3 | 4.8 | 0.0 | 17.3 |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Addams MS-Tallackson | 17 | 88.2 | 41.2 | 47.1 | 23.5 | 64.7 | 58.8 | 17.6 | 35.3 | 5.9 | 11.8 | 47.1 | 29.4 | 11.8 | 23.5 | 35.3 | 11.8 | 2.9 | 5.9 | 23.5 | 35.3 | 29.4 | 17.6 | 17.6 | 29.4 | 0.0 | 0.0 | 0.0 | 9.7 |
| Wacker MS-Krittendon 1 | 22 | 77.3 | 31.8 | 50.0 | 36.4 | 86.4 | 86.4 | 9.1 | 29.5 | 72.7 | 27.3 | 31.8 | 63.6 | 27.3 | 31.8 | 18.2 | 6.8 | 27.3 | 36.4 | 45.5 | 95.5 | 72.7 | 86.4 | 81.8 | 59.1 | 31.8 | 4.5 | 34.5 | |
| Wacker MS-Krittendon 2 | 21 | 38.1 | 23.8 | 71.4 | 42.9 | 76.2 | 42.9 | 19.0 | 33.3 | 76.2 | 14.3 | 61.9 | 47.6 | 47.6 | 28.6 | 14.3 | 4.8 | 7.1 | 38.1 | 42.9 | 23.8 | 76.2 | 66.7 | 57.1 | 85.7 | 61.9 | 31.0 | 0.0 | 23.6 |
| Wacker MS-Krittendon 3 | 18 | 55.6 | 38.9 | 61.1 | 44.4 | 72.2 | 44.4 | 38.9 | 27.8 | 55.6 | 16.7 | 72.2 | 66.7 | 33.3 | 66.7 | 55.6 | 11.1 | 2.8 | 38.9 | 33.3 | 22.2 | 77.8 | 72.2 | 38.9 | 77.8 | 55.6 | 25.0 | 0.0 | 29.4 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | G | S | A | N | S | N | A | S | N | S | G | A | N | S | N | N | G | G | S | A | A | A | A | G | G | S |
| Difficulty ^b | - | E | E | E | A | E | A | D | D | A | A | A | A | A | A | A | A | A | A | A | A | E | A | A | E | A | A | A | A |
| Source ^c | - | N92 | N92 | T | T | N92 | N96 | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N96 | N92 | T | N92 | T | T | T | T | T | T | T | N96 |
| Source Reference ^d | - | E6 | C14 | J17 | K7 | K1 | C5 | M3 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | L5 | K4 | L8 | O14 | N18 | O7 | I8 | S1a | S1b | U2a | U2b | L9 |
| Grade 8 <i>p</i> -value | - | 63.8 | 54.6 | 61.0 | 53.0 | 72.3 | 37.7 | 22.8 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 11.2 | 30.6 | 53.0 | 32.3 | 74.0 | 73.0 | 41.0 | 75.0 | 25.0 | 16.0 | 10.0 | 25.5 |

^a N = Number
G = Geometry & Measurement
A = Algebra
S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
A = Anchor [40.0]
D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
N92 = 1992 National Assessment of Educational Progress
N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table E
P-values for Grade 6, District 2

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25a | 25b | 26 | |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Guggenheim MS-Broughton 1 | 19 | 15.8 | 21.1 | 36.8 | 31.6 | 21.1 | 15.8 | 26.3 | 21.1 | 15.8 | 15.8 | 36.8 | 47.4 | 31.6 | 31.6 | 31.6 | 5.3 | 26.3 | 42.1 | 21.1 | 78.9 | 47.4 | 36.8 | 15.8 | 0.0 | 5.3 | 0.0 | 20.8 | | |
| Guggenheim MS-Broughton 2 | 14 | 28.6 | 28.6 | 21.4 | 21.4 | 42.9 | 21.4 | 0.0 | 25.0 | 14.3 | 7.1 | 35.7 | 35.7 | 28.6 | 50.0 | 42.9 | 7.1 | 3.6 | 21.4 | 50.0 | 7.1 | 35.7 | 50.0 | 21.4 | 50.0 | 7.1 | 0.0 | 0.0 | 23.6 | |
| Guggenheim MS-Dillard 1 | 23 | 87.0 | 69.6 | 95.7 | 47.8 | 73.9 | 60.9 | 34.8 | 43.5 | 4.3 | 65.2 | 78.3 | 43.5 | 26.1 | 56.5 | 56.5 | 43.5 | 13.0 | 47.8 | 52.2 | 39.1 | 65.2 | 39.1 | 21.7 | 78.3 | 17.4 | 23.9 | 4.3 | 33.1 | |
| Guggenheim MS-Dillard 2 | 13 | 38.5 | 53.8 | 53.8 | 15.4 | 61.5 | 30.8 | 15.4 | 23.1 | 15.4 | 15.4 | 53.8 | 30.8 | 23.1 | 30.8 | 23.1 | 38.5 | 0.0 | 30.8 | 53.8 | 30.8 | 53.8 | 46.2 | 23.1 | 76.9 | 15.4 | 0.0 | 3.8 | 33.0 | |
| Hirsch Metro MS-Davenport 1 | 22 | 27.3 | 31.8 | 54.5 | 50.0 | 59.1 | 27.3 | 31.8 | 31.8 | 22.7 | 27.3 | 54.5 | 27.3 | 22.7 | 45.5 | 45.5 | 9.1 | 4.5 | 18.2 | 45.5 | 27.3 | 68.2 | 27.3 | 18.2 | 59.1 | 9.1 | 0.0 | 4.5 | 24.0 | |
| Hirsch Metro MS-Davenport 2 | 25 | 24.0 | 32.0 | 48.0 | 16.0 | 48.0 | 40.0 | 8.0 | 25.0 | 12.0 | 36.0 | 48.0 | 40.0 | 20.0 | 56.0 | 28.0 | 12.0 | 4.0 | 24.0 | 40.0 | 16.0 | 64.0 | 32.0 | 32.0 | 40.0 | 4.0 | 0.0 | 0.0 | 17.2 | |
| Hirsch Metro MS-Holland 1 | 22 | 36.4 | 31.8 | 40.9 | 18.2 | 68.2 | 18.2 | 9.1 | 29.5 | 18.2 | 13.6 | 59.1 | 59.1 | 27.3 | 22.7 | 22.7 | 13.6 | 2.3 | 13.6 | 36.4 | 22.7 | 40.9 | 13.6 | 18.2 | 45.5 | 13.6 | 6.8 | 0.0 | 12.0 | |
| Hirsch Metro MS-Holland 2 | 23 | 39.1 | 34.8 | 47.8 | 26.1 | 65.2 | 21.7 | 8.7 | 34.8 | 17.4 | 21.7 | 47.8 | 34.8 | 21.7 | 17.4 | 17.4 | 17.4 | 10.9 | 30.4 | 30.4 | 13.0 | 39.1 | 39.1 | 34.8 | 69.6 | 21.7 | 0.0 | 0.0 | 12.9 | |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Newberry Middle MS-Renlund | 26 | 53.8 | 42.3 | 61.5 | 38.5 | 73.1 | 42.3 | 19.2 | 29.8 | 19.2 | 38.5 | 80.8 | 34.6 | 11.5 | 11.5 | 30.8 | 38.5 | 3.8 | 19.2 | 34.6 | 15.4 | 42.3 | 23.1 | 26.9 | 19.2 | 7.7 | 0.0 | 0.0 | 6.3 | |
| Newberry Middle MS-Rhaney | 29 | 17.2 | 10.3 | 37.9 | 17.2 | 44.8 | 13.8 | 20.7 | 19.0 | 13.8 | 17.2 | 24.1 | 48.3 | 20.7 | 31.0 | 24.1 | 20.7 | 1.7 | 17.2 | 20.7 | 17.2 | 31.0 | 31.0 | 13.8 | 34.5 | 10.3 | 0.0 | 0.0 | 3.4 | |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | G | S | A | N | S | N | A | S | N | S | G | A | N | S | N | N | G | G | S | A | A | A | A | A | G | G | S |
| Difficulty ^b | - | E | E | E | A | E | A | D | D | A | A | A | A | A | A | A | A | A | A | A | A | E | A | A | E | A | A | A | A | |
| Source ^c | - | N92 | N92 | T | T | N92 | N96 | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N96 | N92 | T | N92 | T | T | T | T | T | T | T | N96 | |
| Source Reference ^d | - | E6 | C14 | J17 | K7 | K1 | C5 | M3 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | L5 | K4 | L8 | O14 | N18 | O7 | I8 | S1a | S1b | U2a | U2b | L9 | |
| Grade 8 <i>p</i> -value | - | 63.8 | 54.6 | 61.0 | 53.0 | 72.3 | 37.7 | 22.8 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 11.2 | 30.6 | 53.0 | 32.3 | 74.0 | 73.0 | 41.0 | 75.0 | 25.0 | 16.0 | 10.0 | 25.5 | |

^a N = Number
G = Geometry & Measurement
A = Algebra
S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
A = Anchor [40.0]
D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
N92 = 1992 National Assessment of Educational Progress
N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table F
P-values for Grade 6, District 3

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25a | 25b | 26 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calhoun North MS-Bragg 1 | 21 | 81.0 | 61.9 | 76.2 | 61.9 | 76.2 | 9.5 | 33.3 | 39.3 | 19.0 | 66.7 | 61.9 | 61.9 | 38.1 | 23.8 | 47.6 | 47.6 | 19.0 | 85.7 | 42.9 | 38.1 | 71.4 | 42.9 | 38.1 | 85.7 | 4.8 | 14.3 | 9.5 | 47.3 |
| Calhoun North MS-Bragg 2 | 21 | 76.2 | 42.9 | 61.9 | 61.9 | 76.2 | 28.6 | 19.0 | 36.9 | 28.6 | 42.9 | 61.9 | 47.6 | 38.1 | 14.3 | 38.1 | 52.4 | 23.8 | 52.4 | 42.9 | 33.3 | 61.9 | 52.4 | 23.8 | 61.9 | 14.3 | 4.8 | 2.4 | 41.0 |
| Calhoun North MS-Schlueter 1 | 22 | 59.1 | 31.8 | 59.1 | 40.9 | 68.2 | 31.8 | 27.3 | 38.6 | 27.3 | 36.4 | 63.6 | 27.3 | 31.8 | 9.1 | 40.9 | 27.3 | 9.1 | 45.5 | 50.0 | 27.3 | 54.5 | 27.3 | 22.7 | 86.4 | 27.3 | 2.3 | 6.8 | 22.5 |
| Calhoun North MS-Schlueter 2 | 20 | 70.0 | 70.0 | 90.0 | 75.0 | 95.0 | 20.0 | 30.0 | 38.8 | 20.0 | 65.0 | 80.0 | 70.0 | 45.0 | 25.0 | 80.0 | 45.0 | 22.5 | 50.0 | 55.0 | 35.0 | 75.0 | 60.0 | 20.0 | 80.0 | 25.0 | 7.5 | 2.5 | 38.1 |
| Calhoun North MS-Solomon 1 | 18 | 83.3 | 33.3 | 88.9 | 38.9 | 88.9 | 33.3 | 55.6 | 45.8 | 27.8 | 33.3 | 50.0 | 61.1 | 61.1 | 27.8 | 61.1 | 16.7 | 13.9 | 55.6 | 61.1 | 44.4 | 77.8 | 44.4 | 5.6 | 83.3 | 5.6 | 16.7 | 2.8 | 31.2 |
| Calhoun North MS-Solomon 2 | 21 | 81.0 | 47.6 | 66.7 | 42.9 | 81.0 | 33.3 | 28.6 | 36.9 | 9.5 | 47.6 | 57.1 | 76.2 | 57.1 | 19.0 | 66.7 | 23.8 | 7.1 | 28.6 | 42.9 | 33.3 | 66.7 | 28.6 | 33.3 | 81.0 | 9.5 | 7.1 | 0.0 | 44.0 |
| Calhoun North MS-Tierney | 24 | 75.0 | 70.8 | 75.0 | 70.8 | 79.2 | 16.7 | 37.5 | 47.9 | 20.8 | 66.7 | 66.7 | 62.5 | 33.3 | 37.5 | 58.3 | 54.2 | 20.8 | 75.0 | 62.5 | 25.0 | 83.3 | 54.2 | 37.5 | 83.3 | 33.3 | 39.6 | 14.6 | 56.6 |
| Calhoun North MS-Vetter | 7 | 42.9 | 14.3 | 28.6 | 42.9 | 28.6 | 0.0 | 28.6 | 25.0 | 28.6 | 28.6 | 42.9 | 28.6 | 14.3 | 14.3 | 14.3 | 0.0 | 7.1 | 0.0 | 14.3 | 0.0 | 42.9 | 28.6 | 14.3 | 57.1 | 0.0 | 0.0 | 0.0 | 14.1 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | G | S | A | N | S | N | A | S | N | S | G | A | N | S | N | N | G | G | S | A | A | A | A | G | G | S |
| Difficulty ^b | - | E | E | E | A | E | A | D | D | A | A | A | A | A | A | A | A | A | A | A | A | E | A | A | E | A | A | A | A |
| Source ^c | - | N92 | N92 | T | T | N92 | N96 | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N96 | N92 | T | N92 | T | T | T | T | T | T | T | N96 |
| Source Reference ^d | - | E6 | C14 | J17 | K7 | K1 | C5 | M3 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | L5 | K4 | L8 | O14 | N18 | O7 | I8 | S1a | S1b | U2a | U2b | L9 |
| Grade 8 <i>p</i> -value | - | 63.8 | 54.6 | 61.0 | 53.0 | 72.3 | 37.7 | 22.8 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 11.2 | 30.6 | 53.0 | 32.3 | 74.0 | 73.0 | 41.0 | 75.0 | 25.0 | 16.0 | 10.0 | 25.5 |

^a N = Number
 G = Geometry & Measurement
 A = Algebra
 S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
 A = Anchor [40.0]
 D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
 N92 = 1992 National Assessment of Educational Progress
 N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table G
P-values for Grade 6, District 4

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25a | 25b | 26 | |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kelvyn Park MS-Downer 1 | 23 | 43.5 | 21.7 | 69.6 | 30.4 | 78.3 | 8.7 | 13.0 | 29.3 | 0.0 | 26.1 | 26.1 | 30.4 | 21.7 | 17.4 | 34.8 | 21.7 | 4.3 | 30.4 | 52.2 | 47.8 | 91.3 | 26.1 | 26.1 | 65.2 | 4.3 | 6.5 | 6.5 | 24.4 | |
| Kelvyn Park MS-Downer 2 | 24 | 20.8 | 16.7 | 20.8 | 16.7 | 50.0 | 33.3 | 37.5 | 18.8 | 12.5 | 8.3 | 41.7 | 33.3 | 20.8 | 25.0 | 45.8 | 8.3 | 2.1 | 16.7 | 8.3 | 12.5 | 25.0 | 16.7 | 4.2 | 16.7 | 0.0 | 0.0 | 0.0 | 1.4 | |
| Kelvyn Park MS-Vega 1 | 13 | 53.8 | 61.5 | 30.8 | 84.6 | 46.2 | 61.5 | 30.8 | 26.9 | 0.0 | 15.4 | 30.8 | 38.5 | 30.8 | 38.5 | 53.8 | 15.4 | 3.8 | 46.2 | 15.4 | 23.1 | 76.9 | 30.8 | 0.0 | 53.8 | 0.0 | 0.0 | 3.8 | 22.8 | |
| Kelvyn Park MS-Vega 2 | 18 | 77.8 | 50.0 | 61.1 | 66.7 | 100.0 | 27.8 | 16.7 | 20.8 | 5.6 | 27.8 | 88.9 | 11.1 | 22.2 | 33.3 | 55.6 | 33.3 | 16.7 | 33.3 | 50.0 | 16.7 | 88.9 | 33.3 | 33.3 | 72.2 | 27.8 | 0.0 | 0.0 | 22.0 | |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | G | S | A | N | S | N | A | S | N | S | G | A | N | S | N | N | G | G | S | A | A | A | A | A | G | G | S |
| Difficulty ^b | - | E | E | E | A | E | A | D | D | A | A | A | A | A | A | A | A | A | A | A | A | E | A | A | E | A | A | A | A | |
| Source ^c | - | N92 | N92 | T | T | N92 | N96 | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N96 | N92 | T | N92 | T | T | T | T | T | T | T | N96 | |
| Source Reference ^d | - | E6 | C14 | J17 | K7 | K1 | C5 | M3 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | L5 | K4 | L8 | O14 | N18 | O7 | I8 | S1a | S1b | U2a | U2b | L9 | |
| Grade 8 <i>p</i> -value | - | 63.8 | 54.6 | 61.0 | 53.0 | 72.3 | 37.7 | 22.8 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 11.2 | 30.6 | 53.0 | 32.3 | 74.0 | 73.0 | 41.0 | 75.0 | 25.0 | 16.0 | 10.0 | 25.5 | |

^a N = Number
 G = Geometry & Measurement
 A = Algebra
 S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
 A = Anchor [40.0]
 D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
 N92 = 1992 National Assessment of Educational Progress
 N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table H
P-values for Grade 7, District 1

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25 | 26 | 27 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fernwood MS-Heath 1 | 23 | 17.4 | 52.2 | 43.5 | 82.6 | 34.8 | 30.4 | 47.8 | 78.3 | 52.2 | 39.1 | 52.2 | 30.4 | 26.1 | 17.4 | 26.1 | 21.7 | 17.4 | 28.7 | 43.5 | 43.5 | 17.3 | 8.7 | 30.4 | 0.0 | 0.0 | 13.0 | 21.7 | 21.7 |
| Fernwood MS-Heath 2 | 19 | 15.8 | 57.9 | 52.6 | 89.5 | 35.5 | 21.1 | 21.1 | 68.4 | 42.1 | 31.6 | 21.1 | 57.9 | 31.6 | 10.5 | 31.6 | 26.3 | 15.8 | 34.8 | 42.1 | 68.4 | 20.9 | 31.6 | 26.3 | 0.0 | 2.6 | 10.5 | 5.3 | 31.6 |
| Von Humboldt MS-Donnelly 1 | 18 | 33.3 | 50.0 | 72.2 | 50.0 | 22.2 | 44.4 | 27.8 | 66.7 | 38.9 | 11.1 | 33.3 | 55.6 | 50.0 | 22.2 | 27.8 | 38.9 | 11.1 | 25.7 | 38.9 | 50.0 | 24.0 | 27.8 | 33.3 | 0.0 | 0.0 | 0.0 | 0.0 | 33.3 |
| Von Humboldt MS-Donnelly 2 | 21 | 33.3 | 57.1 | 33.3 | 42.9 | 20.2 | 38.1 | 38.1 | 47.6 | 61.9 | 28.6 | 57.1 | 47.6 | 28.6 | 9.5 | 23.8 | 19.0 | 19.0 | 23.6 | 33.3 | 61.9 | 7.9 | 4.8 | 28.6 | 2.4 | 0.0 | 0.0 | 9.5 | 23.8 |
| Von Humboldt MS-Donnelly 3 | 17 | 35.3 | 47.1 | 35.3 | 70.6 | 36.8 | 47.1 | 23.5 | 64.7 | 64.7 | 17.6 | 41.2 | 41.2 | 29.4 | 23.5 | 29.4 | 17.6 | 23.5 | 21.4 | 35.3 | 35.3 | 17.6 | 11.8 | 17.6 | 0.0 | 0.0 | 5.9 | 0.0 | 17.6 |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Addams MS-St.James 1 | 20 | 75.0 | 70.0 | 65.0 | 70.0 | 35.0 | 40.0 | 55.0 | 75.0 | 50.0 | 15.0 | 30.0 | 45.0 | 50.0 | 10.0 | 30.0 | 25.0 | 40.0 | 59.5 | 45.0 | 75.0 | 31.5 | 10.0 | 15.0 | 20.0 | 12.5 | 12.5 | 25.0 | 15.0 |
| Addams MS-St.James 2 | 19 | 68.4 | 57.9 | 68.4 | 78.9 | 46.1 | 63.2 | 52.6 | 73.7 | 52.6 | 36.8 | 26.3 | 36.8 | 52.6 | 10.5 | 21.1 | 10.5 | 21.1 | 43.5 | 31.6 | 57.9 | 15.7 | 31.6 | 15.8 | 13.2 | 0.0 | 2.6 | 10.5 | 0.0 |
| Wacker MS-McLaughlin 1 | 20 | 15.0 | 50.0 | 50.0 | 85.0 | 32.5 | 0.0 | 25.0 | 55.0 | 45.0 | 25.0 | 30.0 | 40.0 | 30.0 | 10.0 | 55.0 | 20.0 | 20.0 | 38.0 | 30.0 | 70.0 | 11.6 | 15.0 | 20.0 | 0.0 | 2.5 | 2.5 | 0.0 | 25.0 |
| Wacker MS-McLaughlin 2 | 15 | 13.3 | 33.3 | 26.7 | 73.3 | 15.0 | 6.7 | 13.3 | 66.7 | 46.7 | 33.3 | 26.7 | 26.7 | 6.7 | 20.0 | 6.7 | 20.0 | 20.0 | 24.3 | 40.0 | 46.7 | 4.4 | 6.7 | 13.3 | 0.0 | 0.0 | 3.3 | 13.3 | 26.7 |
| Wacker MS-McLaughlin 3 | 10 | 30.0 | 60.0 | 50.0 | 90.0 | 32.5 | 0.0 | 50.0 | 90.0 | 80.0 | 20.0 | 20.0 | 20.0 | 30.0 | 20.0 | 10.0 | 10.0 | 36.5 | 20.0 | 90.0 | 6.6 | 10.0 | 30.0 | 0.0 | 0.0 | 5.0 | 20.0 | 20.0 | |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | S | A | N | A | S | N | S | G | A | N | S | S | N | G | G | S | G | A | S | A | A | G | G | N | N | A |
| Difficulty ^b | - | A | E | A | E | D | A | A | A | A | A | A | A | A | D | A | A | D | A | A | A | D | A | A | A | A | A | D | D |
| Source ^c | - | N96 | T | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N92 | N92 | N92 | T | N96 | T | T | T | T | T | T | T | N96 | N92 | T |
| Source Reference ^d | - | C5 | J17 | K7 | K1 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | M3 | K4 | O14 | P9 | L9 | L8 | O7 | V2 | S1b | I8 | U2a | U2b | L5 | M4 | II |
| Grade 8 <i>p</i> -value | - | 37.7 | 61.0 | 53.0 | 72.3 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 22.8 | 30.6 | 32.3 | 28.0 | 25.5 | 53.0 | 73.0 | 19.0 | 25.0 | 41.0 | 16.0 | 10.0 | 11.2 | 21.9 | 32.0 |

^a N = Number
G = Geometry & Measurement
A = Algebra
S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
A = Anchor [40.0]
D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
N92 = 1992 National Assessment of Educational Progress
N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table I
P-values for Grade 7, District 2

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25 | 26 | 27 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Guggenheim MS-Keeton 1 | 24 | 8.3 | 41.7 | 20.8 | 66.7 | 36.5 | 25.0 | 33.3 | 62.5 | 62.5 | 25.0 | 29.2 | 33.3 | 29.2 | 25.0 | 45.8 | 33.3 | 33.3 | 42.7 | 45.8 | 70.8 | 24.9 | 16.7 | 41.7 | 4.2 | 6.3 | 8.3 | 12.5 | 33.3 |
| Guggenheim MS-Keeton 2 | 23 | 8.7 | 47.8 | 39.1 | 91.3 | 31.5 | 26.1 | 34.8 | 73.9 | 65.2 | 13.0 | 39.1 | 34.8 | 21.7 | 39.1 | 34.8 | 39.1 | 30.4 | 44.7 | 47.8 | 52.2 | 23.0 | 30.4 | 17.4 | 2.2 | 0.0 | 10.9 | 0.0 | 17.4 |
| Guggenheim MS-Teague 1 | 25 | 56.0 | 56.0 | 40.0 | 68.0 | 21.0 | 12.0 | 28.0 | 44.0 | 52.0 | 32.0 | 52.0 | 52.0 | 32.0 | 16.0 | 40.0 | 36.0 | 20.0 | 13.2 | 28.0 | 44.0 | 6.6 | 4.0 | 12.0 | 0.0 | 0.0 | 8.0 | 4.0 | 20.0 |
| Guggenheim MS-Teague 2 | 23 | 65.2 | 47.8 | 34.8 | 52.2 | 27.2 | 21.7 | 30.4 | 60.9 | 47.8 | 21.7 | 39.1 | 52.2 | 17.4 | 17.4 | 26.1 | 21.7 | 30.4 | 31.6 | 34.8 | 39.1 | 5.7 | 13.0 | 17.4 | 0.0 | 0.0 | 2.2 | 4.3 | 30.4 |
| Hirsch Metro MS-Draski 1 | 26 | 34.6 | 46.2 | 34.6 | 50.0 | 43.3 | 23.1 | 15.4 | 73.1 | 53.8 | 26.9 | 42.3 | 69.2 | 34.6 | 19.2 | 38.5 | 46.2 | 34.6 | 47.1 | 53.8 | 46.2 | 29.3 | 19.2 | 30.8 | 9.6 | 3.8 | 9.6 | 34.6 | 11.5 |
| Hirsch Metro MS-Draski 2 | 24 | 58.3 | 66.7 | 16.7 | 58.3 | 22.9 | 37.5 | 12.5 | 58.3 | 54.2 | 25.0 | 16.7 | 33.3 | 33.3 | 29.2 | 20.8 | 33.3 | 16.7 | 24.8 | 58.3 | 20.8 | 11.0 | 8.3 | 12.5 | 2.1 | 8.3 | 6.3 | 4.2 | 12.5 |
| Hirsch Metro MS-McFadden 1 | 18 | 27.8 | 72.2 | 38.9 | 55.6 | 26.4 | 16.7 | 33.3 | 50.0 | 44.4 | 38.9 | 33.3 | 33.3 | 27.8 | 16.7 | 44.4 | 22.2 | 22.2 | 20.2 | 66.7 | 33.3 | 5.5 | 0.0 | 38.9 | 2.8 | 2.8 | 0.0 | 0.0 | 27.8 |
| Hirsch Metro MS-McFadden 2 | 24 | 45.8 | 62.5 | 25.0 | 54.2 | 27.1 | 25.0 | 12.5 | 50.0 | 50.0 | 29.2 | 29.2 | 29.2 | 25.0 | 20.8 | 25.0 | 4.2 | 29.2 | 13.8 | 41.7 | 54.2 | 1.4 | 0.0 | 29.2 | 0.0 | 0.0 | 2.1 | 16.7 | 29.2 |
| <i>—Conventional—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Newberry MS-Cunningham 1 | 14 | 7.1 | 42.9 | 21.4 | 64.3 | 19.6 | 21.4 | 14.3 | 35.7 | 35.7 | 14.3 | 21.4 | 7.1 | 21.4 | 14.3 | 14.3 | 14.3 | 14.3 | 9.4 | 35.7 | 14.3 | 11.8 | 0.0 | 21.4 | 0.0 | 0.0 | 0.0 | 0.0 | 14.3 |
| Newberry MS-Cunningham 2 | 13 | 38.5 | 23.1 | 46.2 | 15.4 | 11.5 | 61.5 | 0.0 | 23.1 | 69.2 | 23.1 | 7.7 | 30.8 | 7.7 | 0.0 | 53.8 | 23.1 | 30.8 | 12.7 | 38.5 | 38.5 | 5.1 | 0.0 | 15.4 | 0.0 | 0.0 | 0.0 | 15.4 | 38.5 |
| Newberry MS-Stark 1 | 22 | 40.9 | 50.0 | 40.9 | 63.6 | 17.0 | 9.1 | 27.3 | 63.6 | 68.2 | 27.3 | 22.7 | 22.7 | 13.6 | 9.1 | 36.4 | 36.4 | 22.7 | 16.5 | 40.9 | 27.3 | 6.0 | 18.2 | 0.0 | 4.5 | 0.0 | 2.3 | 18.2 | 9.1 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | S | A | N | A | S | N | S | G | A | N | S | S | N | G | G | S | G | A | S | A | A | G | G | N | N | A |
| Difficulty ^b | - | A | E | A | E | D | A | A | A | A | A | A | A | A | D | A | A | D | A | A | A | D | A | A | A | A | A | D | D |
| Source ^c | - | N96 | T | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N92 | N92 | N92 | T | N96 | T | T | T | T | T | T | T | N96 | N92 | T |
| Source Reference ^d | - | C5 | J17 | K7 | K1 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | M3 | K4 | O14 | P9 | L9 | L8 | O7 | V2 | S1b | I8 | U2a | U2b | L5 | M4 | I1 |
| Grade 8 <i>p</i> -value | - | 37.7 | 61.0 | 53.0 | 72.3 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 22.8 | 30.6 | 32.3 | 28.0 | 25.5 | 53.0 | 73.0 | 19.0 | 25.0 | 41.0 | 16.0 | 10.0 | 11.2 | 21.9 | 32.0 |

^a N = Number
 G = Geometry & Measurement
 A = Algebra
 S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
 A = Anchor [40.0]
 D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
 N92 = 1992 National Assessment of Educational Progress
 N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table J
P-values for Grade 7, District 3

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|-------------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|-------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25 | 26 | 27 |
| <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calhoun North MS-Perry 1 | 19 | 57.9 | 63.2 | 47.4 | 73.7 | 32.9 | 36.8 | 73.7 | 84.2 | 42.1 | 47.4 | 52.6 | 68.4 | 47.4 | 21.1 | 47.4 | 42.1 | 21.1 | 48.8 | 36.8 | 63.2 | 54.3 | 42.1 | 36.8 | 26.3 | 15.8 | 18.4 | 21.1 | 31.6 |
| Calhoun North MS-Perry 2 | 22 | 63.6 | 77.3 | 45.5 | 81.8 | 39.8 | 36.4 | 77.3 | 81.8 | 50.0 | 27.3 | 40.9 | 54.5 | 59.1 | 36.4 | 54.5 | 27.3 | 27.3 | 51.1 | 72.7 | 72.7 | 31.6 | 22.7 | 18.2 | 9.1 | 15.9 | 13.6 | 4.5 | 31.8 |
| Calhoun North MS-Perry 3 | 21 | 33.3 | 76.2 | 52.4 | 90.5 | 46.4 | 33.3 | 66.7 | 95.2 | 76.2 | 52.4 | 23.8 | 71.4 | 71.4 | 23.8 | 57.1 | 52.4 | 19.0 | 56.8 | 42.9 | 90.5 | 39.6 | 23.8 | 42.9 | 23.8 | 26.2 | 31.0 | 14.3 | 14.3 |
| Calhoun North MS-Perry 4 | 21 | 33.3 | 81.0 | 47.6 | 85.7 | 25.0 | 19.0 | 57.1 | 76.2 | 85.7 | 42.9 | 19.0 | 71.4 | 42.9 | 14.3 | 61.9 | 42.9 | 38.1 | 49.0 | 66.7 | 66.7 | 57.0 | 4.8 | 23.8 | 23.8 | 7.1 | 14.3 | 14.3 | 28.6 |
| Calhoun North MS-Perry 5 | 22 | 50.0 | 72.7 | 68.2 | 81.8 | 47.7 | 50.0 | 54.5 | 72.7 | 68.2 | 36.4 | 27.3 | 50.0 | 45.5 | 45.5 | 27.3 | 45.5 | 27.3 | 51.1 | 59.1 | 68.2 | 30.1 | 13.6 | 36.4 | 6.8 | 15.9 | 9.1 | 13.6 | 9.1 |
| Calhoun North MS-Perry 6 | 22 | 36.4 | 68.2 | 50.0 | 95.5 | 39.8 | 40.9 | 68.2 | 81.8 | 72.7 | 36.4 | 45.5 | 59.1 | 54.5 | 36.4 | 50.0 | 36.4 | 22.7 | 52.6 | 50.0 | 86.4 | 34.7 | 18.2 | 36.4 | 22.7 | 18.2 | 18.2 | 18.2 | 27.3 |
| Calhoun North MS-Schroeder | 1 | 100.0 | 100.0 | 100.0 | 0.0 | 25.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 | 0.0 | 33.0 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | S | A | N | A | S | N | S | G | A | N | S | S | N | G | G | S | G | A | S | A | A | G | G | N | N | A |
| Difficulty ^b | - | A | E | A | E | D | A | A | A | A | A | A | A | A | D | A | A | D | A | A | A | D | A | A | A | A | A | D | D |
| Source ^c | - | N96 | T | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N92 | N92 | N92 | T | N96 | T | T | T | T | T | T | T | N96 | N92 | T |
| Source Reference ^d | - | C5 | J17 | K7 | K1 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | M3 | K4 | O14 | P9 | L9 | L8 | O7 | V2 | S1b | I8 | U2a | U2b | L5 | M4 | I1 |
| Grade 8 <i>p</i> -value | - | 37.7 | 61.0 | 53.0 | 72.3 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 22.8 | 30.6 | 32.3 | 28.0 | 25.5 | 53.0 | 73.0 | 19.0 | 25.0 | 41.0 | 16.0 | 10.0 | 11.2 | 21.9 | 32.0 |

^a N = Number
 G = Geometry & Measurement
 A = Algebra
 S = Statistics & Probability

^b E = Easy [mean grade 8 item *p*-value 64.0]
 A = Anchor [40.0]
 D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
 N92 = 1992 National Assessment of Educational Progress
 N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table K
P-values for Grade 7, District 4

| School-Teacher (Class) | (N) | Item Number | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|-----|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24a | 24b | 25 | 26 | 27 |
| | | <i>—MiC—</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kelvyn Park MS-Finn 1 | 25 | 44.0 | 68.0 | 52.0 | 96.0 | 34.0 | 16.0 | 60.0 | 88.0 | 64.0 | 44.0 | 24.0 | 64.0 | 48.0 | 16.0 | 32.0 | 24.0 | 4.0 | 27.8 | 16.0 | 32.0 | 10.6 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kelvyn Park MS-Finn 2 | 23 | 52.2 | 73.9 | 47.8 | 73.9 | 39.1 | 8.7 | 52.2 | 87.0 | 52.2 | 4.3 | 26.1 | 43.5 | 39.1 | 17.4 | 30.4 | 39.1 | 8.7 | 25.8 | 30.4 | 21.7 | 5.7 | 17.4 | 13.0 | 0.0 | 2.2 | 6.5 | 4.3 | 4.3 |
| Kelvyn Park MS-Woodward 1 | 19 | 21.1 | 26.3 | 57.9 | 68.4 | 35.5 | 31.6 | 52.6 | 73.7 | 52.6 | 21.1 | 42.1 | 36.8 | 36.8 | 10.5 | 26.3 | 21.1 | 15.8 | 1.7 | 26.3 | 0.0 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kelvyn Park MS-Woodward 2 | 17 | 29.4 | 23.5 | 35.3 | 47.1 | 14.7 | 0.0 | 11.8 | 47.1 | 47.1 | 11.8 | 35.3 | 11.8 | 0.0 | 5.9 | 5.9 | 23.5 | 11.8 | 1.9 | 5.9 | 11.8 | 0.0 | 0.0 | 5.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kelvyn Park MS-Yackle 1 | 18 | 44.4 | 61.1 | 61.1 | 88.9 | 30.6 | 22.2 | 50.0 | 94.4 | 61.1 | 22.2 | 22.2 | 66.7 | 38.9 | 33.3 | 44.4 | 50.0 | 33.3 | 36.8 | 55.6 | 38.9 | 14.7 | 5.6 | 16.7 | 11.1 | 8.3 | 2.8 | 16.7 | 5.6 |
| Kelvyn Park MS-Yackle 2 | 14 | 50.0 | 42.9 | 42.9 | 64.3 | 23.2 | 7.1 | 35.7 | 50.0 | 50.0 | 21.4 | 42.9 | 35.7 | 14.3 | 0.0 | 50.0 | 42.9 | 14.3 | 25.9 | 28.6 | 28.6 | 2.4 | 7.1 | 21.4 | 7.1 | 7.1 | 7.1 | 14.3 | 21.4 |
| | | <i>Item Details</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strand ^a | - | N | G | S | A | N | A | S | N | S | G | A | N | S | S | N | G | G | S | G | A | S | A | A | G | G | N | N | A |
| Difficulty ^b | - | A | E | A | E | D | A | A | A | A | A | A | A | A | D | A | A | D | A | A | A | D | A | A | A | A | A | D | D |
| Source ^c | - | N96 | T | T | N92 | N96 | T | T | N92 | T | N92 | T | T | T | N92 | N92 | N92 | T | N96 | T | T | T | T | T | T | T | N96 | N92 | T |
| Source Reference ^d | - | C5 | J17 | K7 | K1 | C13 | P10 | O5 | E7 | R8 | M5 | L11 | I2 | C18 | M3 | K4 | O14 | P9 | L9 | L8 | O7 | V2 | S1b | I8 | U2a | U2b | L5 | M4 | I1 |
| Grade 8 <i>p</i> -value | - | 37.7 | 61.0 | 53.0 | 72.3 | 27.8 | 46.0 | 47.0 | 58.7 | 54.0 | 29.2 | 27.0 | 54.0 | 35.7 | 22.8 | 30.6 | 32.3 | 28.0 | 25.5 | 53.0 | 73.0 | 19.0 | 25.0 | 41.0 | 16.0 | 10.0 | 11.2 | 21.9 | 32.0 |

^a N = Number
G = Geometry & Measurement
A = Algebra
S = Statistics & Probability

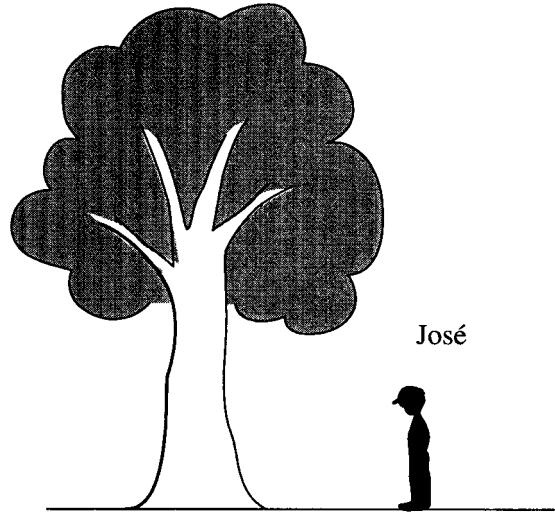
^b E = Easy [mean grade 8 item *p*-value 64.0]
A = Anchor [40.0]
D = Difficult [24.2]

^c T = Third International Mathematics and Science Study
N92 = 1992 National Assessment of Educational Progress
N96 = 1996 National Assessment of Educational Progress

^d Block and item number as referenced by producer of assessment.

Table L-1a
EA items, Grade 5

1.



José is 1.5 m tall. About how tall is the tree?

GBT1L8

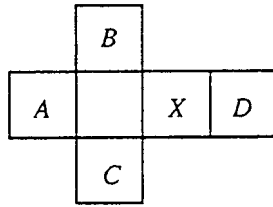
- A) 4 m
- B) 6 m
- C) 8 m
- D) 10 m
- E)

2. If $1\frac{1}{3}$ cups of flour are needed for a batch of cookies, how many cups of flour will be needed for 3 batches?

NAN1E6

- A) $4\frac{1}{3}$
- B) 4
- C) 3
- D) $2\frac{2}{3}$

3.



The squares in the figure above represent the faces of a cube which has been cut along some edges and flattened. When the original cube was resting on face *X*, which face was on top?

GAN1C14

- A) A
- B) B
- C) C
- D) D

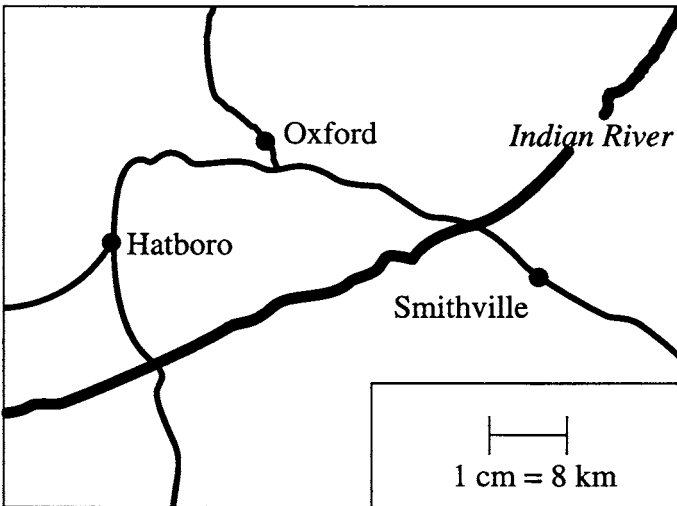
4. Three-fifths of the students in a class are girls. If 5 girls and 5 boys are added to the class, which statement is true of the class?

NAT1Q5

- A) There are more girls than boys
- B) There are the same number of girls as there are boys
- C) There are more boys than girls
- D) You cannot tell whether there are more girls or boys from the information given

5.

GAT1J17



About how far apart are Oxford and Smithville on the land?

- A) 4 km
- B) 16 km
- C) 35 km
- D) 50 km

6. Steve was asked to pick two marbles from a bag of yellow marbles and blue marbles. One possible result was one yellow marble first and one blue marble second. He wrote this result in the table below. List all of the other possible results that Steve could get.

SAN1E9

y stands for one yellow marble.

b stands for one blue marble.

| | First Marble | Second Marble |
|--|-----------------|------------------|
| | y | b |

7. A drawer contains 28 pens; some white, some blue, some red, and some gray. If the probability of selecting a blue pen is $\frac{2}{7}$, how many blue pens are in the drawer?

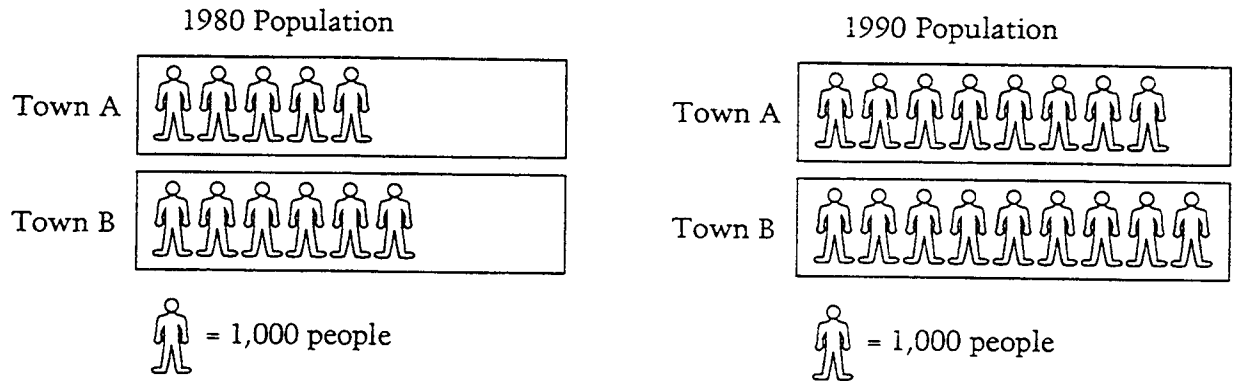
SBT1K7

- A) 4
- B) 6
- C) 8
- D) 10
- E) 20

8. If k can be replaced by any number, how many different values can the expression $k + 6$ have?

AAN1K1

- A) None
- B) One
- C) Six
- D) Seven
- E) Infinitely many



9. In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

NBP1L5

Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount. Use mathematics to explain how Brian might have justified his claim.

Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.

10. If m represents a positive number, which of these is equivalent to $m + m + m + m$?

ABT1P10

- A) $m + 4$
- B) $4m$
- C) m^4
- D) $4(m + 1)$

11. Each of the six faces of a certain cube is painted either red or blue. When the cube is tossed, the probability of the cube landing with a red face up is $\frac{2}{3}$. How many faces are red?

SBT1O5

- A) One
- B) Two
- C) Three
- D) Four
- E) Five

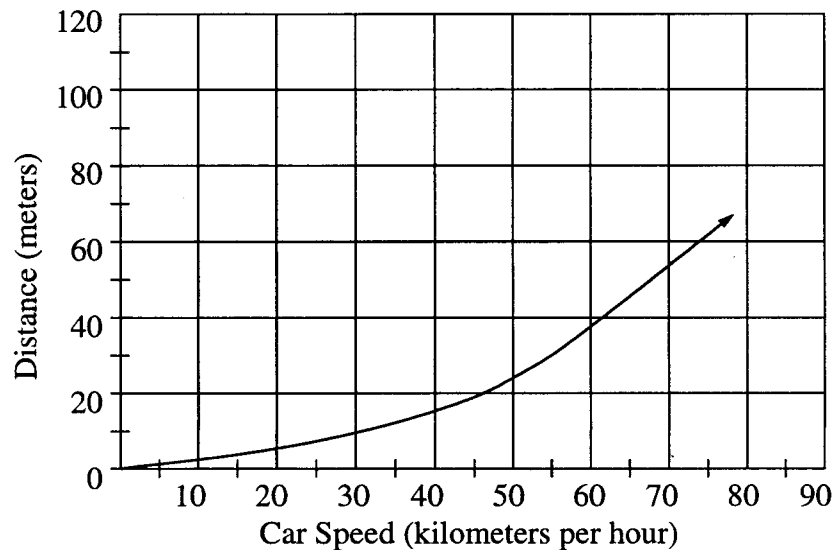
12. Jill needs to earn \$45.00 for a class trip. She earns \$2.00 each day on Mondays, Tuesdays, and Wednesdays, and \$3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earn \$45.00 ?

NBN1E7

Answer: _____

13. The graph below shows the distance traveled before coming to a stop after the brakes are applied for a typical car traveling at different speeds.

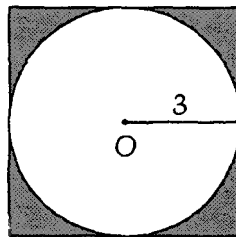
SBT1R8



A car is traveling 80km per hour. About how far will the car travel after the brakes are applied?

- A) 60 m B) 70 m C) 85 m D) 100 m

14.



In the figure above, a circle with center O and radius of length 3 is inscribed in a square. What is the area of the shaded region?

GBN1M5

- A) 3.86 B) 7.73 C) 28.27 D) 32.86 E) 36.00

15. A rubber ball rebounds to half the height it drops. If the ball is dropped from a rooftop 18 m above the ground, what is the total distance traveled by the time it hits the ground the third time?

ABT1L11

- A) 31.5 m B) 40.5 m C) 45 m D) 63 m

16. Two groups of tourists each have 60 people. If $\frac{3}{4}$ of the first group and $\frac{2}{3}$ of the second group board buses to travel to a museum, how many more people in the first group board buses than in the second group?

A) 2 B) 4 C) 5 D) 40 E) 45

NBT112

17. From a shipment of 500 batteries, a sample of 25 was selected at random and tested. If 2 batteries in the sample were found to be dead, how many dead batteries would be expected in the entire shipment?

A) 10 B) 20 C) 30 D) 40 E) 50

SBT1C18

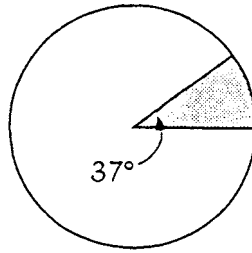
18. A straight line on a graph passes through the points (3, 2) and (4, 4). Which of these points also lies on the line?

A) (1, 1)
B) (2, 4)
C) (5, 6)
D) (6, 3)
E) (6, 5)

ABT118

19.

RADIO SALES



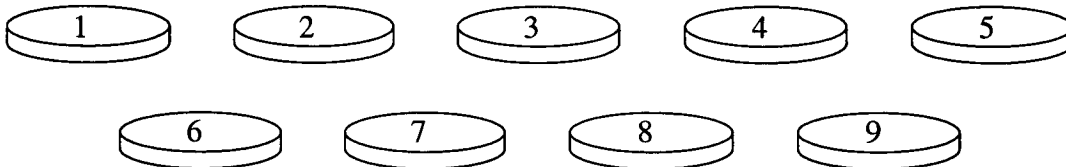
The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle?

NBN1K4

- A) 70 B) 275 C) 985 D) 25,880 E) 98,420

20. The nine chips shown are placed in a jar and mixed.

SAT1N18

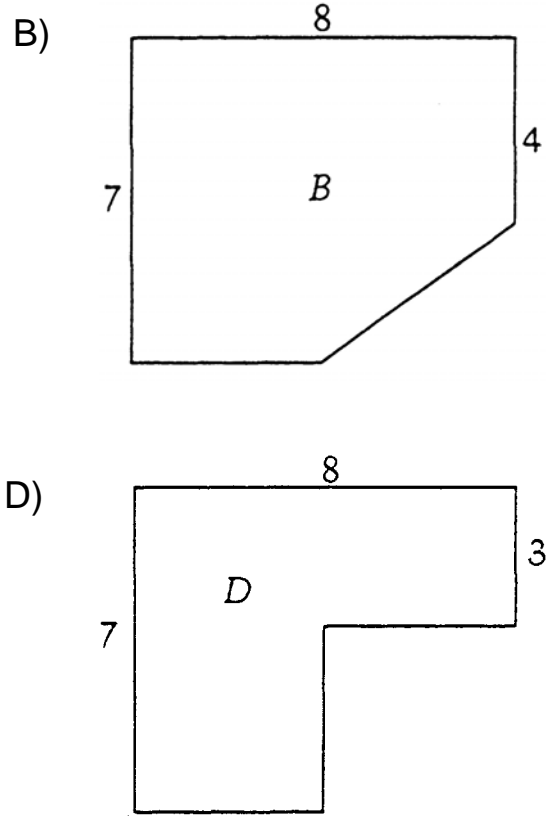
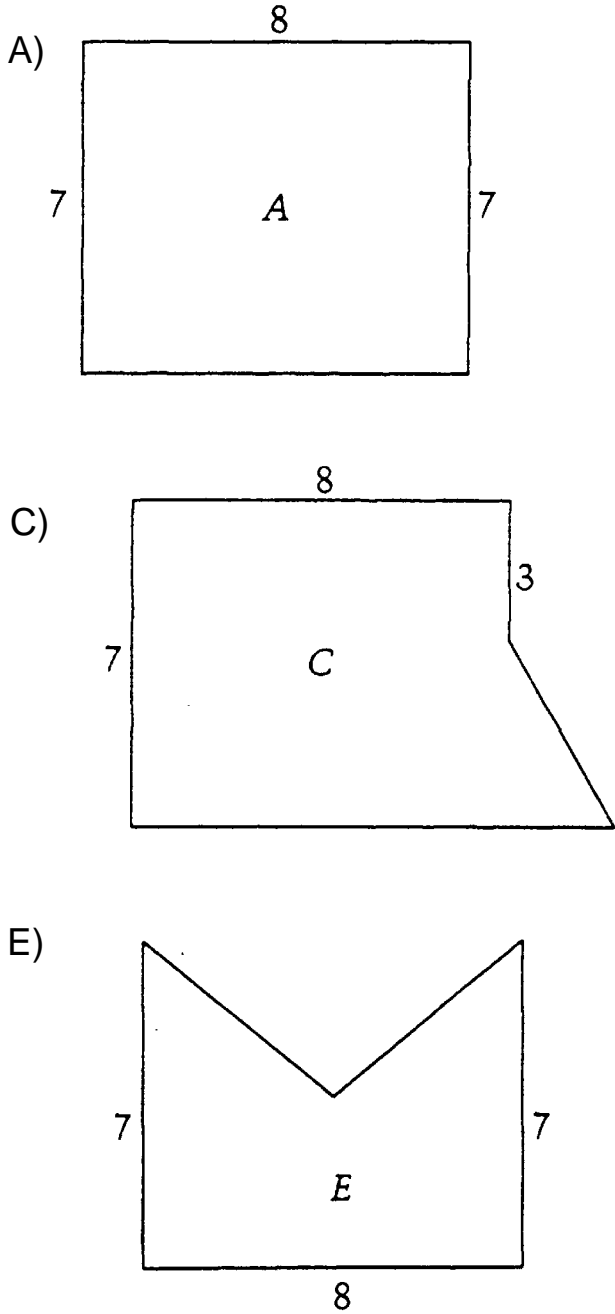


Madeleine draws one chip from the jar. What is the probability that Madeleine draws a chip with an even number?

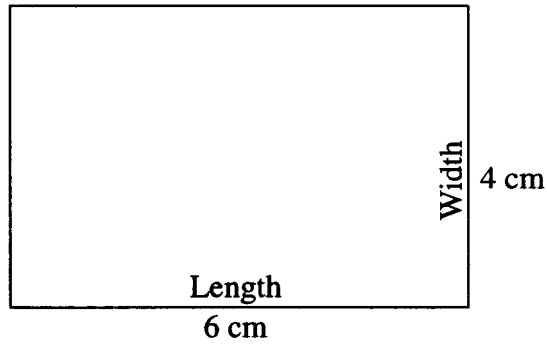
- A) $\frac{1}{9}$ B) $\frac{2}{9}$ C) $\frac{4}{9}$ D) $\frac{1}{2}$

21. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1014

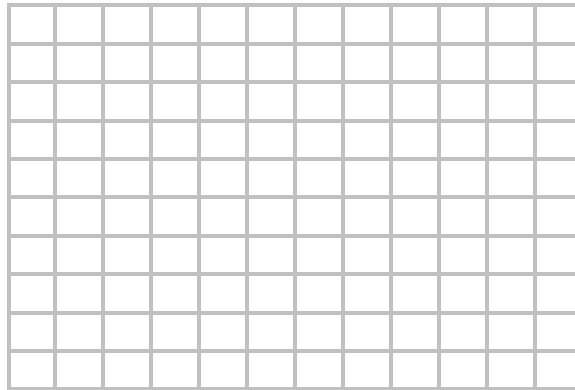


22.



- a. In the space below, draw a new rectangle whose length is one and one half times the length of the rectangle above, and whose width is half the width of the rectangle above. Show the length and width of the new rectangle in centimeters on the figure.

GBT1U2a



- b. What is the ratio of the area of the new rectangle to the area of the first one?
Show your work.

GBT1U2b

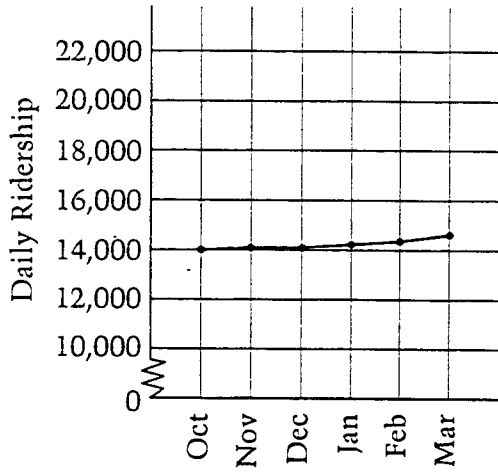
This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

23. METRO RAIL COMPANY

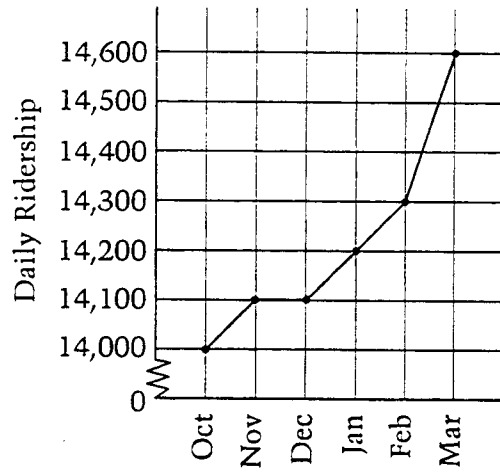
| Month | Daily Ridership |
|----------|-----------------|
| October | 14,000 |
| November | 14,100 |
| December | 14,100 |
| January | 14,200 |
| February | 14,300 |
| March | 14,600 |

The data in the table above has been correctly represented by both graphs shown below.

Graph A



Graph B



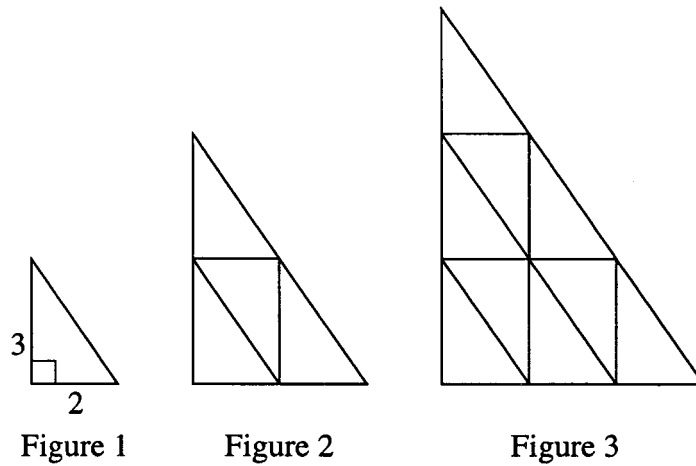
Which graph would be best to help convince others that the Metro Rail Company made a lot more money from ticket sales in March than in October?

SBP1L9

Explain your reason for making this selection

Why might people who thought that there was little difference between October and March ticket sales consider the graph you chose to be misleading?

24. Here is a sequence of three similar triangles. All of the small triangles are congruent.



a. Complete the chart by finding how many small triangles make up each figure.

AAT1S1a

| Figure | Number of small triangles |
|--------|---------------------------|
| 1 | 1 |
| 2 | |
| 3 | |

The sequence of similar triangles is extended to the 8th Figure. How many small triangles would be needed for Figure 8?

ACT1S1b

Answer _____

25. If $3(x + 5) = 30$, then $x =$

ABT1O7

- A) 2
- B) 5
- C) 10
- D) 95

26. Of the following, which is the closest approximation of a 15 percent tip on a restaurant check of \$24.99?

NBP1C5

- A) \$2.50
- B) \$3.00
- C) \$3.75
- D) \$4.50
- E) \$5.00

Table L-1b
EA details, Grade 5

| Item | | | | Response Format | | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | | Comments |
|------|---------|----------|-------------------------|-----------------|-------------------|-----------|-------------|--------|-------------------------|-----------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------------------|-------|---|
| | | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Multi Choice Resp | Stgy Code | Item Format | Domain | Informal | Preformal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | Gr | p-val | |
| 1 | 1501001 | GBT1L8 | Jose's Tree | 1 | B | | MC | G | X | | | | 2 | | | | | 1 | | | | | | | | | 1 | 60 | Interpret a problem situation; identify a non-standard unit; determine height; select correct answer. |
| 2 | 1502001 | NAN1E6 | Flour for Cookies | 1 | B | | MC | N | X | | | 2 | 1 | | 2 | 2 | | | | | | | | | | | 1 | 63.8 | Identify appropriate arithmetic operation; add or multiply a mixed fraction and a whole number |
| 3 | 1503001 | GAN1C14 | Flattened Cube | 1 | A | | MC | G | X | | | | | | | | | 2 | 1 | | | | | | | | 2 | 54.6 | Visualize a 3-D object from a 2-D net; determine opposite sides |
| 4 | 1504001 | NAT1Q5 | Boys and Girls in Class | 1 | A | | MC | N | | X | | 2 | | | | | | 2 | 1 | | | | | | | | 2 | 65 | Interpret a ratio; recalculate the ratio based on given information; select correct answer |
| 5 | 1505001 | GAT1J17 | Oxford to Smithville | 1 | C | | MC | G | X | | | 2 | | 1 | | | | | | | | | | | | | 1 | 66 | Estimate distance on a map using a given scale; select correct answer. |
| 6 | 1506001 | SAN1E9 | Blue and Yellow Balls | 1 | | 8 | CR | S | X | | | | | | 1 | | | | 2 | | | | | | | | 1 | 59.1 | Construct a complete sample space for selecting two possible items, successively |
| 7 | 1507001 | SBT1K7 | Blue Pen | 1 | C | | MC | S | X | | | 2 | 1 | | | | | | 2 | | | | | | | | 1 | 53 | Interpret a ratio in a probability context; select correct answer. |
| 8 | 1508001 | AAN1K1 | k+6 | 1 | E | | MC | A | | X | | 1 | 2 | | | | | | 2 | | | | | | | | 1 | 72.3 | Interpret a problem situation using variable and infinity; select correct answer. |

Table L-2
EA item details, Grade 5

| Item | | | | Response Format | | Degree of Formalization | | Competency Classes | | | | | | | | | | | | | | | | Performance category | | Gr 8 p-val | Comments | | |
|------|---------|----------|--------------------------|-----------------|------------------|-------------------------|-------------|--------------------|----------|-----------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------|------|---|
| | | | | | | | | Class 1 | | | | Class 2 | | | | Class 3 | | | | | | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult Choice Resp | Stgy Code | Item Format | Domain | Informal | Preformal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 9 | 1509001 | NBP1L5 | Town Populations | 1 | | | CR | N | | | X | | 2 | | | | | 2 | 1 | | | | | | | | 2 | 11.2 | Interpret numerical and graphical representations (pictograph); calculate absolute and relative comparisons; justify both solutions. |
| 9 | 1509002 | NBP1L5 | Town Populations | 0.5 | | | CR | N | | | X | | 2 | | | | | 2 | 1 | | | | | | | | 1 | | Use numerical and graphical representations (pictograph); calculate absolute or relative comparisons; justify solution or lack detail in mathematical justifications. |
| 10 | 1510001 | ABT1P10 | 4m | 1 | B | | MC | A | | X | | 1 | | | | 2 | | | 2 | | | | | | | | 1 | 58 | Simplify algebraic expression; select correct response. |
| 11 | 1511001 | SBT1O5 | Red/Blue Cube | 1 | D | | MC | S | X | | | | 2 | 1 | | | | | | 2 | | | | | | | 1 | 47 | Interpret a ratio in a probability context; select correct answer. |
| 12 | 1512001 | NBN1E7 | Jill's Trip | 1 | | 7 | CR | N | X | | | | 1 | | | | | 2 | | 2 | | | | | | | 2 | 58.7 | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in weeks. |
| 12 | 1512002 | NBN1E7 | Jill's Trip | 1 | | 8 | CR | N | X | | | | 1 | | | | | 2 | | 2 | | | | | | | 2 | | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in days. |
| 13 | 1513001 | SBT1R8 | Car Speed/Stopping Dist. | 1 | B | | MC | S | X | | | | | | | 2 | | | 1 | | | | | | | | 1 | 49 | Interpret a graphical representation (line graph); select correct answer. |
| 14 | 1514001 | GBN1M5 | Square/Circle Area | 1 | B | | MC | G | | | X | | 1 | 2 | | | | | 2 | 2 | | | | | | | 2 | 29.2 | Calculate area of square and circle; calculate difference; select correct answer. |
| 15 | 1515001 | ABT1L11 | Dropped Ball | 1 | C | | MC | A | | X | | | 2 | | | | | 1 | | 2 | | | | | | | 2 | 34 | Model a problem situation; calculate distance (addition); use whole numbers and decimals; select correct answer. |

Table L-3
EA item details, Grade 5

| Item | | | | Response Format | | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | | Comments |
|------|---------|----------|------------------|-----------------|----------------------|-----------|-------------|--------|-------------------------|-----------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------------------|--|--|
| | | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Multiple Choice Resp | Stgy Code | Item Format | Domain | Informal | Preformal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | Gr 8 p-val | | |
| 16 | 1516001 | NBT1I2 | Tourists on Bus | 1 | C | | MC | N | | X | | | 1 | | 2 | | | 2 | | 2 | | | | | | | 1 | 58 | Identify appropriate series or arithmetic calculations (multiplication, subtraction); use whole numbers and fractions; provide correct answer. |
| 17 | 1517001 | SBT1C18 | Batteries | 1 | D | | MC | S | | X | | | 2 | 2 | 2 | | | 2 | 1 | | | | | | | | 2 | 35.7 | Interpret a problem situation; make inferences about a population based on a sample; use ratio; select correct answer. |
| 18 | 1518001 | ABT1I8 | Points on Line | 1 | C | | MC | A | | | X | 1 | | | | | 2 | | | | | | | | | 2 | 41 | Identify a point on a line, given two other points on the line; select correct answer. | |
| 19 | 1519001 | NBN1K4 | Radio Sales | 1 | B | | MC | N | | | X | | 2 | 2 | | 2 | | | 1 | | | | | | | 2 | 30.6 | Interpret circle graph; use fractions and whole numbers; select correct answer. | |
| 20 | 1520001 | SAT1N18 | Nine Chips | 1 | C | | MC | S | X | | | 1 | | 2 | | | | | | | | | | | | 1 | 56 | Write a probability for a problem situation; select correct answer. | |
| 21 | 1521001 | GBN1O14 | Perimeter Shapes | 1 | B | | MC | G | | X | | | 2 | 1 | | | | 2 | | | | | | | | 2 | 32.3 | Use given dimensions to estimate perimeters of irregular polygons; identify polygon that fits given criteria; select correct answer. | |
| 22a | 1522101 | GBT1U2a | Draw Rectangle | 1 | | 20 | CR | G | X | | | | 2 | 2 | | | | 1 | 2 | | | | | | | 1 | 31 | Draw rectangle as specified; use operations with fractions; record dimensions; provide correct answer. | |
| 22a | 1522102 | GBT1U2a | Draw Rectangle | 0.5 | | 10 | CR | G | X | | | | 2 | 2 | | | | 1 | 2 | | | | | | | 1 | | Determine dimensions of a rectangle as specified; use operations with fractions; incorrect or missing drawing. | |
| 22a | 1522103 | GBT1U2a | Draw Rectangle | 0.5 | | 11 | CR | G | X | | | | 2 | 2 | | | | 1 | 2 | | | | | | | 1 | | Draw rectangle as specified; use operations with fractions; provide incorrect dimension(s) or do not provide dimension(s). | |

Table L-4
EA item details, Grade 5

| Item | | | | Response Format | | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | | Comments | |
|------|---------|----------|------------------------|-----------------|------------------|-----------|-------------|--------|-------------------------|-----------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------------------|------|---|--|
| | | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult Choice Resp | Stgy Code | Item Format | Domain | Informal | Preformal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | Gr 8 p-val | | | |
| 22b | 1522201 | GBT1U2b | Rectangle Ratio (area) | 1 | | 20 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | 10 | Calculate areas of rectangles; write correct ratio for a problem situation |
| 22b | 1522202 | GBT1U2b | Rectangle Ratio (area) | 1 | | 21 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; write a ratio for a problem situation |
| 22b | 1522203 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 10 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio for a problem situation (invert ratio) |
| 22b | 1522204 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 11 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio or provide no ratio. |
| 22b | 1522205 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 12 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; calculate difference between areas |
| 22b | 1522206 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 13 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; write incorrect ratio or provide no ratio |
| 22b | 1522207 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 14 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; calculate difference between areas. |
| 23 | 1523001 | SBP1L9 | Metro Rail | 1 | | | CR | S | | | X | | | | | | | | 1 | | | | | | | | 3 | 25.5 | Critically analyze two graphical representations of data; recognize differences in scales; draw correct conclusion; provide justification | |
| 23 | 1523002 | SBP1L9 | Metro Rail | 0.66 | | | CR | S | | | X | | | | | | | | 1 | | | | | | | | 2 | | Critically analyze two graphical representations of data; draw correct conclusion; provide incomplete justification | |
| 23 | 1523003 | SBP1L9 | Metro Rail | 0.33 | | | CR | S | | | X | | | | | | | | 1 | | | | | | | | 2 | | Critically analyze two graphical representations of data; draw correct conclusion; provide incorrect or no justification | |
| 24a | 1524101 | AAT1S1a | Similar Triangles | 1 | | 10 | CR | A | X | | | | | | 1 | 2 | | | | | | | | | | | 1 | 75 | Count number of triangles in three different figures | |
| 24b | 1524201 | ABT1S1b | Similar Triangles (b) | 1 | | 10 | CR | A | | X | | | | | | | | 2 | 1 | | | | | | | | 1 | 26 | Interpret a pattern demonstrated in diagrams; extend the pattern to the 8th figure; provide correct answer. | |
| 25 | 1525001 | ABT1O7 | $3(x+5)=30$ | 1 | B | | MC | A | | X | | 1 | 2 | | | | | | | | | | | | | | 1 | 72 | Solve an equation; use the distribution property; select correct answer. | |
| 26 | 1526001 | NBP1C5 | Tip Calc. | 1 | C | | MC | N | X | | | | 1 | 2 | 2 | | | | | | | | | | | | 1 | 37.7 | Identify appropriate operation (multiplication); use percent and decimals; select correct answer. | |

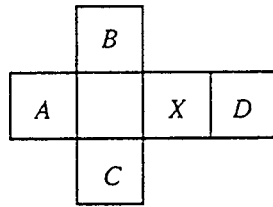
Table M-1a
EA items, Grade 6

1. If $1\frac{1}{3}$ cups of flour are needed for a batch of cookies, how many cups of flour will be needed for 3 batches?

NAN1E6

- A) $4\frac{1}{3}$
- B) 4
- C) 3
- D) $2\frac{2}{3}$

2.



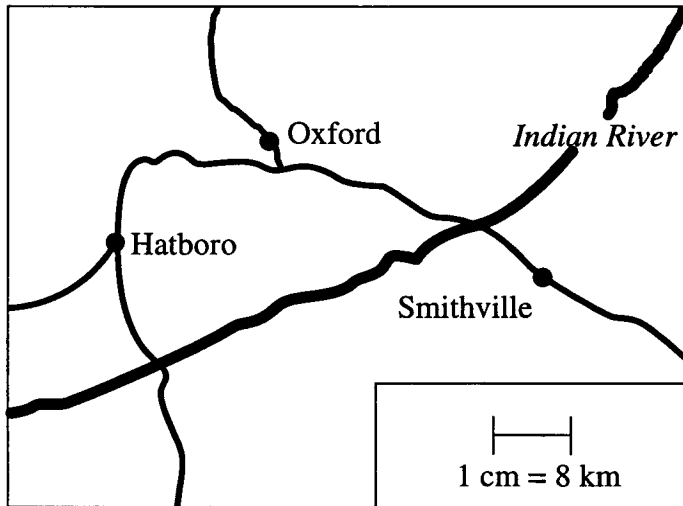
The squares in the figure above represent the faces of a cube which has been cut along some edges and flattened. When the original cube was resting on face X, which face was on top?

GAN1C14

- A) A
- B) B
- C) C
- D) D

3.

GAT1J17



About how far apart are Oxford and Smithville on the land?

- A) 4 km
- B) 16 km
- C) 35 km
- D) 50 km

4. A drawer contains 28 pens; some white, some blue, some red, and some gray. If the probability of selecting a blue pen is $\frac{2}{7}$, how many blue pens are in the drawer?

SBT1K7

- A) 4
- B) 6
- C) 8
- D) 10
- E) 20

5. If k can be replaced by any number, how many different values can the expression $k + 6$ have?

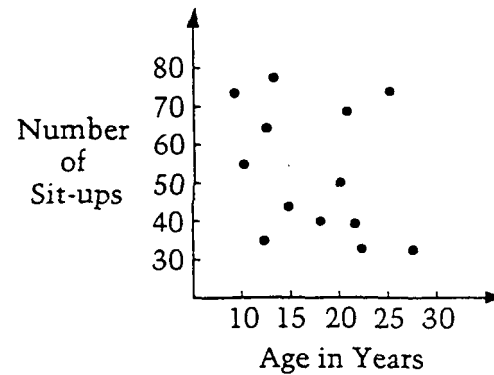
- A) None B) One C) Six D) Seven E) Infinitely many

AAN1K1

6. Of the following, which is the closest approximation of a 15 percent tip on a restaurant check of \$24.99?

- A) \$2.50
B) \$3.00
C) \$3.75
D) \$4.50
E) \$5.00

NBP1C5



7. In the graph above, each dot shows the number of sit-ups and the corresponding age for one of the 13 people. According to this graph, what is the median number of sit-ups for these 13 people?

- A) 15 B) 20 C) 45 D) 50 E) 55

SCN1M3

8. In a game, Carla and Maria are making subtraction problems using tiles numbered 1 to 5. The player whose subtraction problem gives the largest answer wins the game.

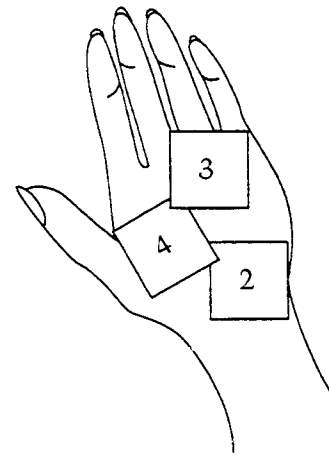
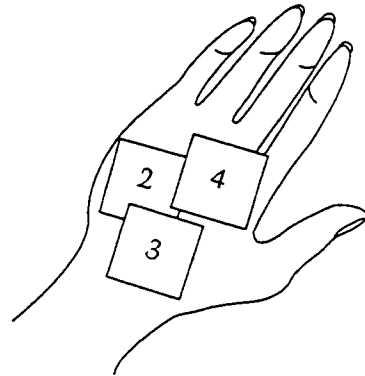
Look at where each girl placed her two tiles.

Carla

| | | |
|---|---|--|
| 1 | | |
| - | 5 | |

Maria

| | | |
|---|--|---|
| | | 5 |
| - | | 1 |



Who will win the game? _____

Explain how you know this person will win.

NCP1C13

9. If m represents a positive number, which of these is equivalent to $m + m + m + m$?

ABT1P10

- A) $m + 4$
- B) $4m$
- C) m^4
- D) $4(m + 1)$

10. Each of the six faces of a certain cube is painted either red or blue. When the cube is tossed, the probability of the cube landing with a red face up is $\frac{2}{3}$. How many faces are red?

SBT1O5

- A) One
- B) Two
- C) Three
- D) Four
- E) Five

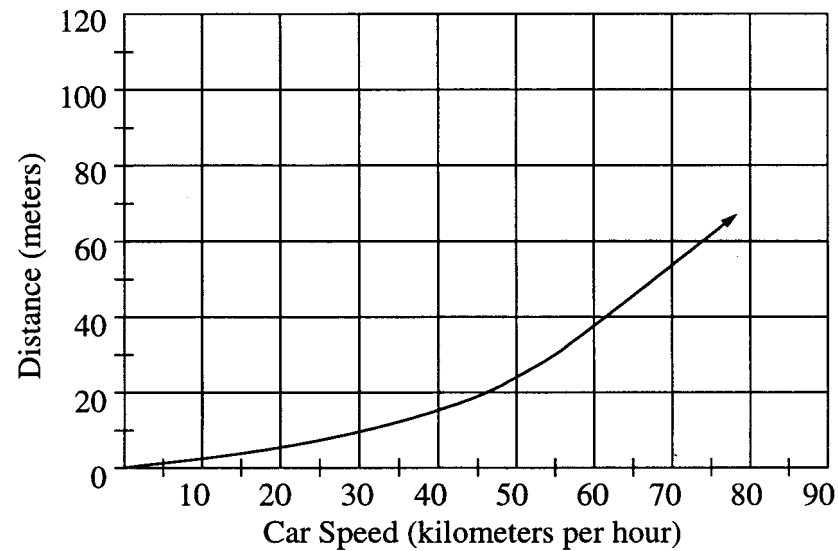
11. Jill needs to earn \$45.00 for a class trip. She earns \$2.00 each day on Mondays, Tuesdays, and Wednesdays, and \$3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earn \$45.00 ?

NBN1E7

Answer: _____

12. The graph below shows the distance traveled before coming to a stop after the brakes are applied for a typical car traveling at different speeds.

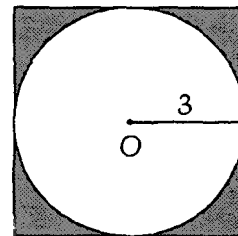
SBT1R8



A car is traveling 80km per hour. About how far will the car travel after the brakes are applied?

- A) 60 m B) 70 m C) 85 m D) 100 m

13.



In the figure above, a circle with center O and radius of length 3 is inscribed in a square. What is the area of the shaded region? GBN1M5

- A) 3.86 B) 7.73 C) 28.27 D) 32.86 E) 36.00

14. A rubber ball rebounds to half the height it drops. If the ball is dropped from a rooftop 18 m above the ground, what is the total distance traveled by the time it hits the ground the third time?

ABT1L11

- A) 31.5 m
- B) 40.5 m
- C) 45 m
- D) 63 m

15. Two groups of tourists each have 60 people. If $\frac{3}{4}$ of the first group and $\frac{2}{3}$ of the second group board buses to travel to a museum, how many more people in the first group board buses than in the second group?

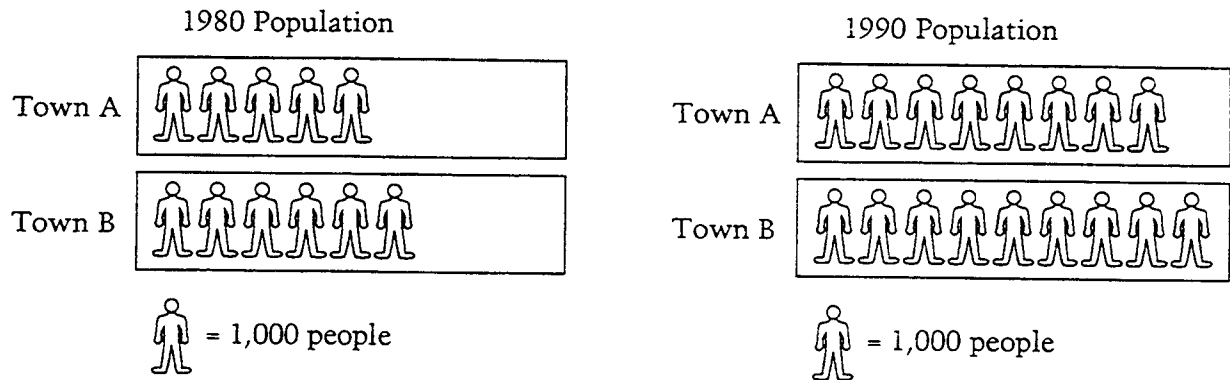
NBT112

- A) 2 B) 4 C) 5 D) 40 E) 45

16. From a shipment of 500 batteries, a sample of 25 was selected at random and tested. If 2 batteries in the sample were found to be dead, how many dead batteries would be expected in the entire shipment?

SBT1C18

- A) 10
- B) 20
- C) 30
- D) 40
- E) 50



17. In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

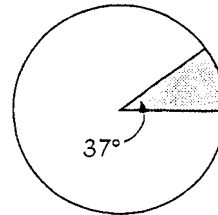
NBP1L5

Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount. Use mathematics to explain how Brian might have justified his claim.

Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.

18.

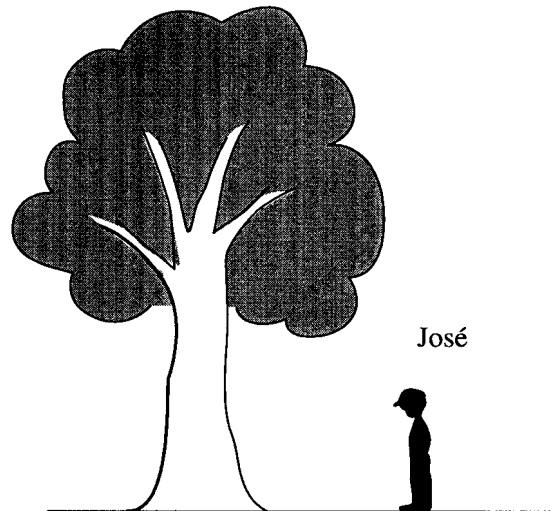
RADIO SALES



The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle? NBN1K4

- A) 70 B) 275 C) 985 D) 25,880 E) 98,420

19.



José is 1.5 m tall. About how tall is the tree?

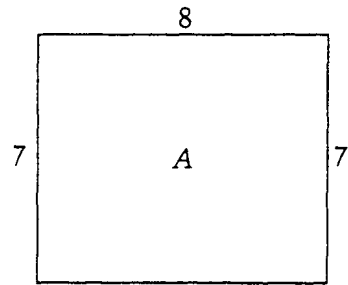
- A) 4 m
B) 6 m
C) 8 m
D) 10 m

GBT1L8

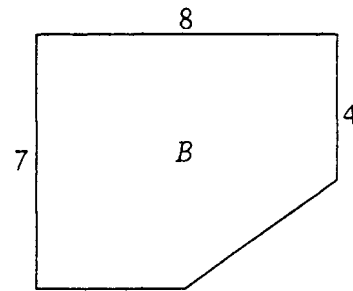
20. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1O14

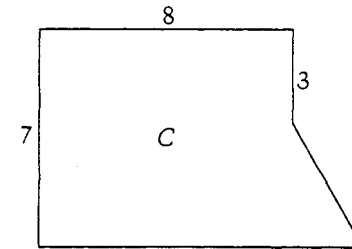
A)



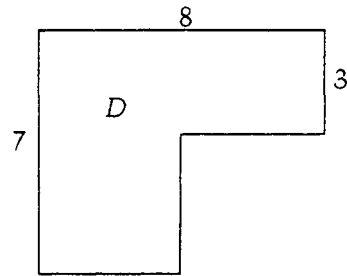
B)



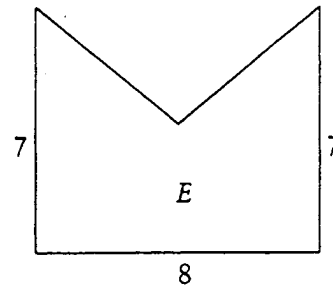
C)



D)

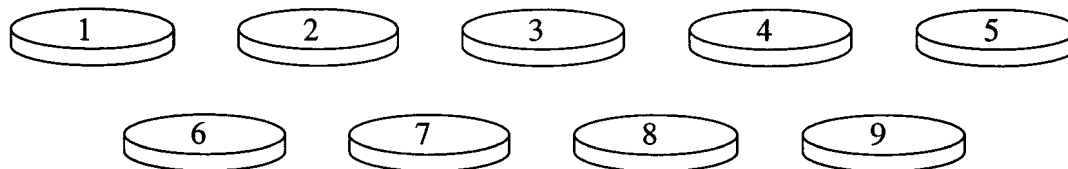


E)



21. The nine chips shown are placed in a jar and mixed.

SAT1N18



Madeleine draws one chip from the jar. What is the probability that Madeleine draws a chip with an even number?

- A) $\frac{1}{9}$ B) $\frac{2}{9}$ C) $\frac{4}{9}$ D) $\frac{1}{2}$

22. If $3(x + 5) = 30$, then $x =$

ABT1O7

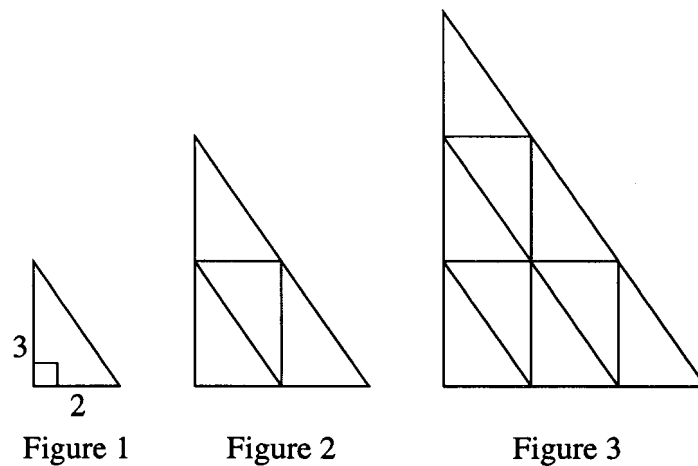
- A) 2
B) 5
C) 10
D) 95

23. A straight line on a graph passes through the points (3, 2) and (4, 4). Which of these points also lies on the line?

ABT118

- A) (1, 1)
B) (2, 4)
C) (5, 6)
D) (6, 3)
E) (6, 5)

24. Here is a sequence of three similar triangles. All of the small triangles are congruent.



a. Complete the chart by finding how many small triangles make up each figure.

AAT1S1a

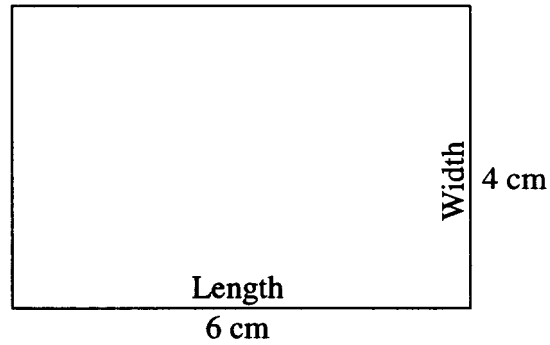
| Figure | Number of small triangles |
|--------|---------------------------|
| 1 | 1 |
| 2 | |
| 3 | |

The sequence of similar triangles is extended to the 8th Figure. How many small triangles would be needed for Figure 8?

ACT1S1b

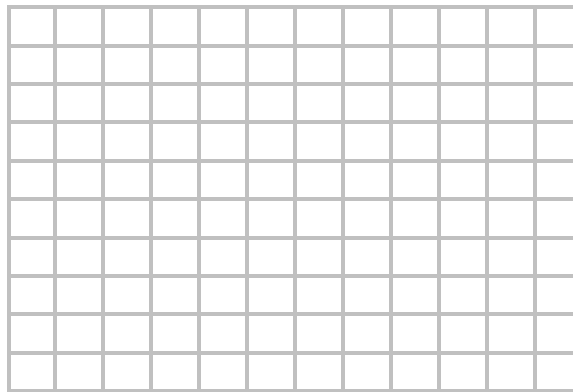
Answer _____

25.



- a. In the space below, draw a new rectangle whose length is one and one half times the length of the rectangle above, and whose width is half the width of the rectangle above. Show the length and width of the new rectangle in centimeters on the figure.

GBT1U2a



- b. What is the ratio of the area of the new rectangle to the area of the first one?
Show your work.

GBT1U2b

This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

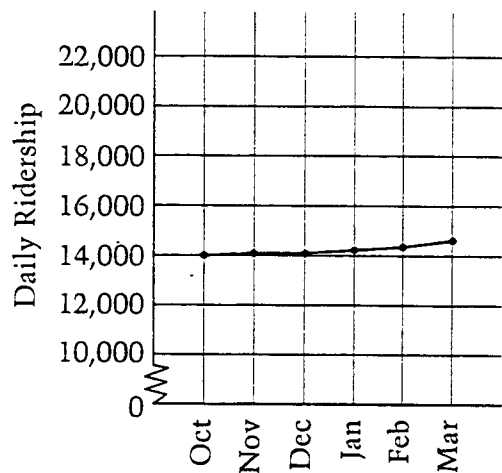
26.

METRO RAIL COMPANY

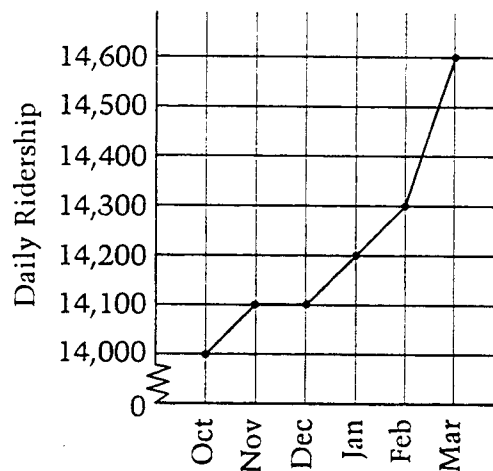
| Month | Daily Ridership |
|----------|-----------------|
| October | 14,000 |
| November | 14,100 |
| December | 14,100 |
| January | 14,200 |
| February | 14,300 |
| March | 14,600 |

The data in the table above has been correctly represented by both graphs shown below.

Graph A



Graph B



Which graph would be best to help convince others that the Metro Rail Company made a lot more money from ticket sales in March than in October?

SBP1L9

Explain your reason for making this selection

Why might people who thought that there was little difference between October and March ticket sales consider the graph you chose to be misleading?

Table M-1b
EA item details, Grade 6

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | | | | |
|------|---------|----------|------------------------|-----------------|---------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|----------------------|------------|----------|------------|-----------------------|----------------------|--|
| # | ACER ID | Ref Code | Name | Score Points | Multi. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | Class 2 | | | | Class 3 | | | | | | | | | |
| | | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | | | | reflection | original mathematical | mathematical insight | multiple complex methods |
| 1 | 1601001 | NAN1E6 | Flour for Cookies | 1 | B | | MC | N | X | | | | 1 | | 2 | | | | | | | | | | | 1 | 64 | Identify appropriate arithmetic operation; add mixed numbers or multiply mixed numbers by a whole number; select correct answer. |
| 2 | 1602001 | GAN1C14 | Flattened Cube | 1 | A | | MC | G | X | | | | | | | | 2 | 1 | | | | | | | | 2 | 55 | Visualize a 3-D object from a 2-D net; determine opposite sides; select correct answer. |
| 3 | 1603001 | GAT1J17 | Oxford to Smithville | 1 | C | | MC | G | X | | | | 2 | | 1 | | | | | | | | | | | 1 | 66 | Estimate distance on a map using a given scale; select correct answer. |
| 4 | 1604001 | SBT1K7 | Blue Pen | 1 | C | | MC | S | X | | | | 2 | 1 | | | | 2 | | | | | | | | 1 | 53 | Interpret a ratio in a probability context; select correct answer. |
| 5 | 1605001 | AAN1K1 | k+6 | 1 | E | | MC | A | | X | | | 1 | | 2 | | | 2 | | | | | | | | 1 | 72 | Interpret a problem situation using variable and infinity; select correct answer. |
| 6 | 1606001 | NBP1C5 | Tip Calc. | 1 | C | | MC | N | X | | | | 1 | 2 | 2 | | | | | | | | | | | 1 | 38 | Identify appropriate operation (multiplication); use percent and decimals; select correct answer. |
| 7 | 1607001 | SCN1M3 | Sit-ups scatterplot | 1 | D | | MC | S | | X | | | | 1 | | | | | 2 | | | | | | | 1 | 23 | Interpret a graphical representation; determine median value; select correct answer. |
| 8 | 1608001 | NCP1C13 | Carla's& Maria's tiles | 1 | | | CR | N | | X | | | 2 | | | | | | 1 | 2 | | | | | | 2 | 28 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer; complete explanation. |

Table M-2
EA item details, Grade 6

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | Performance category Gr 8 p-val | Comments | | | | |
|------|---------|----------|--------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|------------------------------------|--------------------------|----------------|---|--|--|
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | Class 2 | | | Class 3 | | | | | | | | | | | |
| | | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 8 | 1608002 | NCP1C13 | Carla's& Maria's tiles | 0.75 | | | CR | N | | X | | | 2 | | | | | 1 | 2 | | | | | | | | 2 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer with relevant explanation. | |
| 8 | 1608003 | NCP1C13 | Carla's& Maria's tiles | 0.5 | | | CR | N | | X | | | 2 | | | | | 1 | 2 | | | | | | | | 1 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer with partially correct, or incomplete, relevant explanation. | |
| 8 | 1608004 | NCP1C13 | Carla's& Maria's tiles | 0.25 | | | CR | N | | X | | | 2 | | | | | 1 | 2 | | | | | | | | 1 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer but provide example. | |
| 9 | 1609001 | ABT1P10 | 4m | 1 | B | | MC | A | | X | | 1 | | | | 2 | | | 2 | | | | | | | | 1 | 58 | Simplify algebraic expression; select correct response. |
| 10 | 1610001 | SBT1O5 | Red/Blue Cube | 1 | D | | MC | S | X | | | | 2 | 1 | | | | | | 2 | | | | | | | 1 | 47 | Interpret a ratio in a probability context; select correct answer. |
| 11 | 1611001 | NBN1E7 | Jill's Trip | 1 | | 7 | CR | N | X | | | | 1 | | | | | 2 | | 2 | | | | | | | 2 | 59 | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in weeks. |
| 11 | 1611002 | NBN1E7 | Jill's Trip | 1 | | 8 | CR | N | X | | | | 1 | | | | | 2 | | 2 | | | | | | | 2 | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in days. | |
| 12 | 1612001 | SBT1R8 | Car Speed/Stopping Dist. | 1 | B | | MC | S | X | | | | | | | 2 | | | 1 | | | | | | | | 1 | 49 | Interpret a graphical representation (line graph); select correct answer. |
| 13 | 1613001 | GBN1M5 | Square/Circle Area | 1 | B | | MC | G | | | X | | 1 | 2 | | | | | | 2 | 2 | | | | | | 2 | 29 | Calculate area of square and circle; calculate difference; select correct answer. |

Table M-3
EA item details, Grade 6

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | Performance category | | Comments | | | |
|------|---------|----------|------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|------------|----|---|
| | | | | | | | | | | | Class 1 | | | | Class 2 | | | | Class 3 | | | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | Gr 8 p-val | | |
| 14 | 1614001 | ABT1L11 | Dropped Ball | 1 | C | | MC | A | | X | | | 2 | | | | | 1 | 2 | | | | | | | | 2 | 34 | Model a problem situation; calculate distance (addition); use whole numbers and decimals; select correct answer. |
| 15 | 1615001 | NBT1I2 | Tourists on Bus | 1 | C | | MC | N | | X | | | 1 | 2 | | | | 2 | 2 | | | | | | | | 1 | 58 | Identify appropriate series or arithmetic calculations (multiplication, subtraction); use whole numbers and fractions; provide correct answer. |
| 16 | 1616001 | SBT1C18 | Batteries | 1 | D | | MC | S | | X | | | 2 | 2 | 2 | | | 2 | 1 | | | | | | | | 2 | 36 | Interpret a problem situation; make inferences about a population based on a sample; use ratio; select correct answer. |
| 17 | 1617001 | NBP1L5 | Town Populations | 1 | | | CR | N | | | X | | 2 | | | | | 2 | 1 | | | | | | | | 2 | 11 | Interpret numerical and graphical representations (pictograph); calculate absolute and relative comparisons; justify both solutions. |
| 17 | 1617002 | NBP1L5 | Town Populations | 0.5 | | | CR | N | | | X | | 2 | | | | | 2 | 1 | | | | | | | | 1 | | Use numerical and graphical representations (pictograph); calculate absolute or relative comparisons; justify solution or lack detail in mathematical justifications. |
| 18 | 1618001 | NBN1K4 | Radio Sales | 1 | B | | MC | N | | | X | | 2 | 2 | | 2 | | | 1 | | | | | | | | 2 | 31 | Interpret circle graph; use fractions and whole numbers; select correct answer. |
| 19 | 1619001 | GBT1L8 | Jose's Tree | 1 | B | | MC | G | X | | | | 2 | | | | | 1 | | | | | | | | | 1 | 60 | Interpret a problem situation; identify a non-standard unit; determine height; select correct answer. |

Table M-4
EA item details, Grade 6

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | | Comments | |
|------|---------|----------|-----------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------------|------|----------|--|
| | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | Gr 8 | p-val | |
| 20 | 1620001 | GBN1O14 | Perimeter Shapes | 1 | B | | MC | G | | X | | | 2 | 1 | | | | 2 | | | | | | | | | 1 | 32 | Use given dimensions to estimate perimeters of irregular polygons; identify polygon that fits given criteria; select correct answer. |
| 21 | 1621001 | SAT1N18 | Nine Chips | 1 | C | | MC | S | X | | | 1 | | 2 | | | | | | | | | | | | | 1 | 56 | Write a probability for a problem situation; select correct answer. |
| 22 | 1622001 | ABT1O7 | $3(x+5)=30$ | 1 | B | | MC | A | | X | | 1 | 2 | | | | | | | | | | | | | | 1 | 72 | Solve an equation; use the distributive property; select correct answer. |
| 23 | 1623001 | ABT1I8 | Points on Line | 1 | C | | MC | A | | | X | 1 | | | | | 2 | | | | | | | | | | 2 | 41 | Identify a point on a line, given two other points on the line; select correct answer. |
| 24a | 1624101 | AAT1S1a | Similar Triangles | 1 | | 10 | CR | A | X | | | | | | 1 | 2 | | | | | | | | | | | 1 | 75 | Count number of small triangles in three different figures; provide correct answer. |
| 24b | 1624201 | ABT1S1b | Similar Triangles (b) | 1 | | 10 | CR | A | | X | | | | | | | 2 | 1 | | | | | | | | 2 | 1 | 26 | Interpret a pattern demonstrated in diagrams; extend the pattern to the 8th figure; provide correct answer. |
| 25a | 1625101 | GBT1U2a | Draw Rectangle | 1 | | 20 | CR | G | X | | | 2 | 2 | | | | | 1 | 2 | | | | | | | | 1 | 31 | Draw rectangle as specified; use operations with fractions; record dimensions; provide correct answer. |
| 25a | 1625102 | GBT1U2a | Draw Rectangle | 0.5 | | 10 | CR | G | X | | | 2 | 2 | | | | | 1 | 2 | | | | | | | | 1 | | Determine dimensions of a rectangle as specified; use operations with fraction; incorrect or missing drawing |
| 25a | 1625103 | GBT1U2a | Draw Rectangle | 0.5 | | 11 | CR | G | X | | | 2 | 2 | | | | | 1 | 2 | | | | | | | | 1 | | Draw rectangle as specified; use operations with fractions; provide incorrect dimension(s) or do not provide dimension(s). |

Table M-5
EA item details, Grade 6

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category Gr 8 p-val | | Comments | | | |
|------|---------|----------|------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|------------------------------------|--|----------|---|----|---|
| | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sigy Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | | | |
| 25b | 1625201 | GBT1U2b | Rectangle Ratio (area) | 1 | | 20 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | 10 | Calculate areas of rectangles; write correct ratio for a problem situation |
| 25b | 1625202 | GBT1U2b | Rectangle Ratio (area) | 1 | | 21 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | 10 | Calculate areas of rectangles based on incorrect answer to Part A; write a ratio for a problem situation |
| 25b | 1625203 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 10 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio for a problem situation (invert ratio) |
| 25b | 1625204 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 11 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio or provide no ratio. |
| 25b | 1625205 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 12 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; calculate difference between areas |
| 25b | 1625206 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 13 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; write incorrect ratio or provide no ratio |
| 25b | 1625207 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 14 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; calculate difference between areas. |
| 26 | 1626001 | SBP1L9 | Metro Rail | 1 | | | CR | S | | | X | | | | | | | | 1 | | | | | | | | | | 3 | 26 | Critically analyze two graphical representations of data; recognize differences in scales; draw correct conclusion; provide justification |
| 26 | 1626002 | SBP1L9 | Metro Rail | 0.66 | | | CR | S | | | X | | | | | | | | 1 | | | | | | | | | | 2 | | Critically analyze two graphical representations of data; draw correct conclusion; provide incomplete justification |
| 26 | 1626003 | SBP1L9 | Metro Rail | 0.33 | | | CR | S | | | X | | | | | | | | 1 | | | | | | | | | | 2 | | Critically analyze two graphical representations of data; draw correct conclusion; provide incorrect or no justification |

Table N-1a
EA items, Grade 7

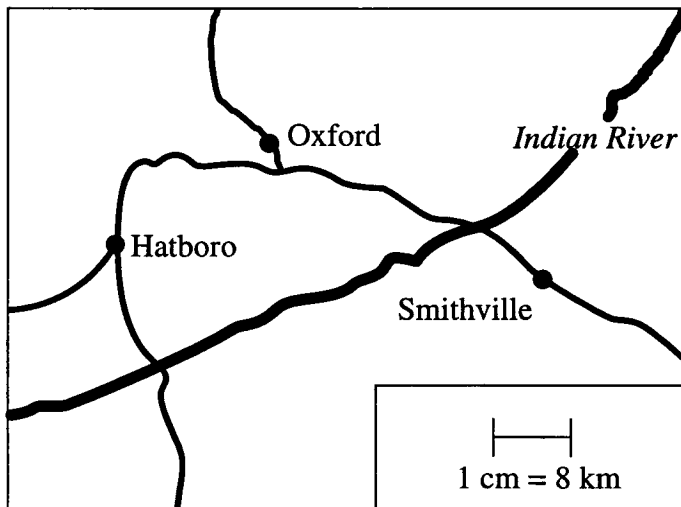
1. Of the following, which is the closest approximation of a 15 percent tip on a restaurant check of \$24.99?

NBP1C5

- A) \$2.50
- B) \$3.00
- C) \$3.75
- D) \$4.50
- E) \$5.00

2.

GAT1J17



About how far apart are Oxford and Smithville on the land?

- A) 4 km
- B) 16 km
- C) 35 km
- D) 50 km

3. A drawer contains 28 pens; some white, some blue, some red, and some gray. If the probability of selecting a blue pen is $\frac{2}{7}$, how many blue pens are in the drawer?

SBT1K7

- A) 4
- B) 6
- C) 8
- D) 10
- E) 20

4. If k can be replaced by any number, how many different values can the expression $k + 6$ have?

AAN1K1

- A) None
- B) One
- C) Six
- D) Seven
- E) Infinitely many

5. In a game, Carla and Maria are making subtraction problems using tiles numbered 1 to 5. The player whose subtraction problem gives the largest answer wins the game.

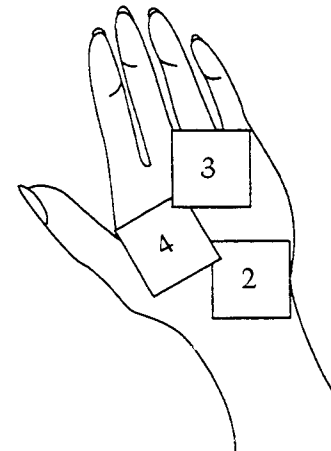
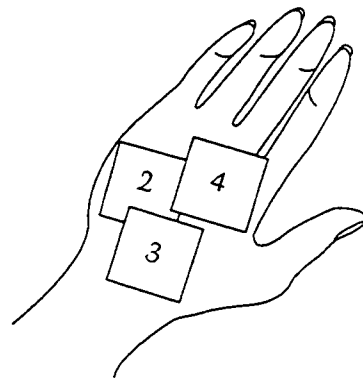
Look at where each girl placed her two tiles.

Carla

| | | |
|---|---|--|
| 1 | | |
| - | 5 | |

Maria

| | | |
|---|--|---|
| | | 5 |
| - | | 1 |



Who will win the game? _____

Explain how you know this person will win.

NCP1C13

6. If m represents a positive number, which of these is equivalent to $m + m + m + m$?

ABT1P10

- A) $m + 4$
- B) $4m$
- C) m^4
- D) $4(m + 1)$

7. Each of the six faces of a certain cube is painted either red or blue. When the cube is tossed, the probability of the cube landing with a red face up is $\frac{2}{3}$. How many faces are red?

SBT1O5

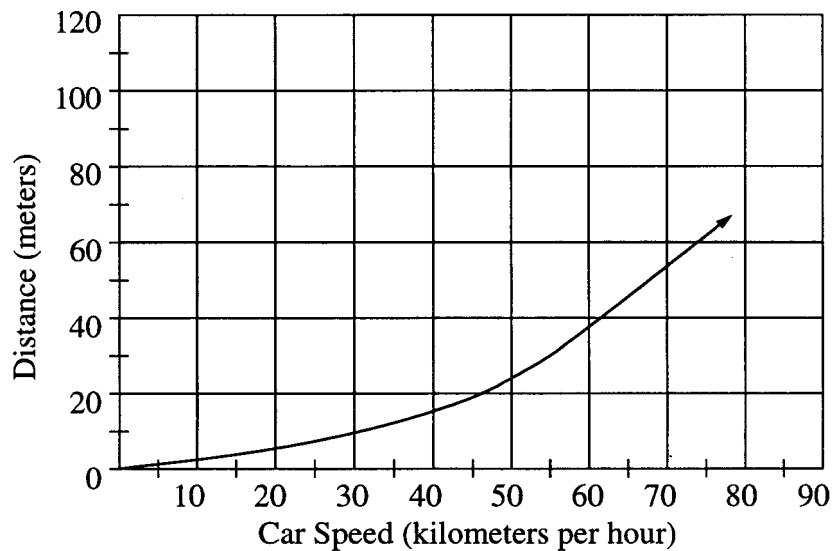
- A) One
- B) Two
- C) Three
- D) Four
- E) Five

8. Jill needs to earn \$45.00 for a class trip. She earns \$2.00 each day on Mondays, Tuesdays, and Wednesdays, and \$3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earn \$45.00 ?

NBN1E7

Answer: _____

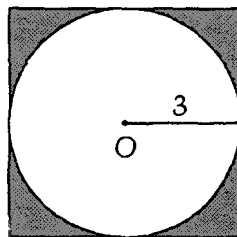
9. The graph below shows the distance traveled before coming to a stop after the brakes are applied for a typical car traveling at different speeds. SBT1R8



A car is traveling 80km per hour. About how far will the car travel after the brakes are applied?

- A) 60 m B) 70 m C) 85 m D) 100 m

10.



In the figure above, a circle with center O and radius of length 3 is inscribed in a square. What is the area of the shaded region? GBN1M5

- A) 3.86 B) 7.73 C) 28.27 D) 32.86 E) 36.00

11. A rubber ball rebounds to half the height it drops. If the ball is dropped from a rooftop 18 m above the ground, what is the total distance traveled by the time it hits the ground the third time? ABT1L11

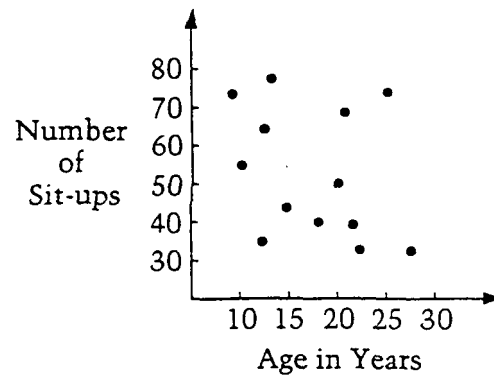
- A) 31.5 m
- B) 40.5 m
- C) 45 m
- D) 63 m

12. Two groups of tourists each have 60 people. If $\frac{3}{4}$ of the first group and $\frac{2}{3}$ of the second group board buses to travel to a museum, how many more people in the first group board buses than in the second group? NBT1I2

- A) 2 B) 4 C) 5 D) 40 E) 45

13. From a shipment of 500 batteries, a sample of 25 was selected at random and tested. If 2 batteries in the sample were found to be dead, how many dead batteries would be expected in the entire shipment? SBT1C18

- A) 10
- B) 20
- C) 30
- D) 40
- E) 50

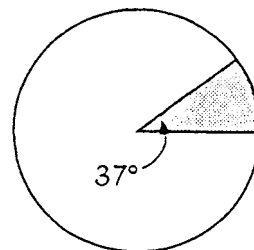


14. In the graph above, each dot shows the number of sit-ups and the corresponding age for one of the 13 people. According to this graph, what is the median number of sit-ups for these 13 people? SCN1M3

- A) 15
- B) 20
- C) 45
- D) 50
- E) 55

15.

RADIO SALES

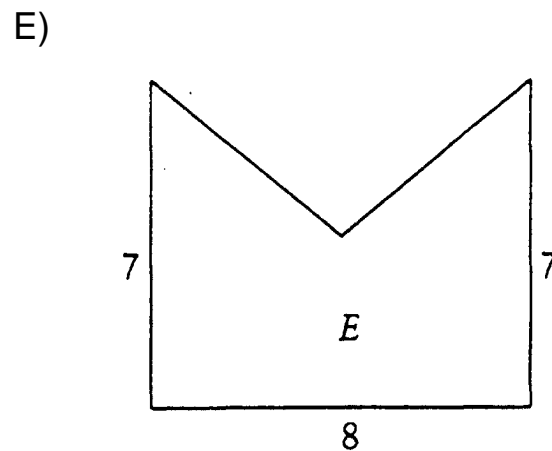
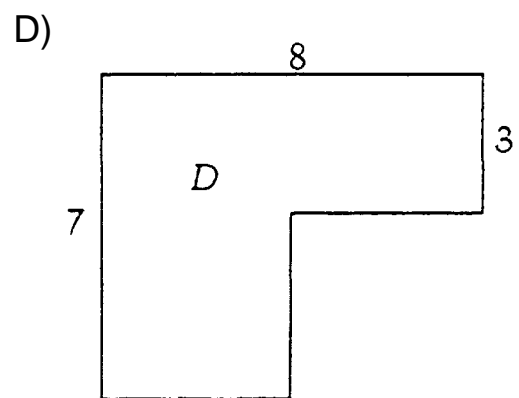
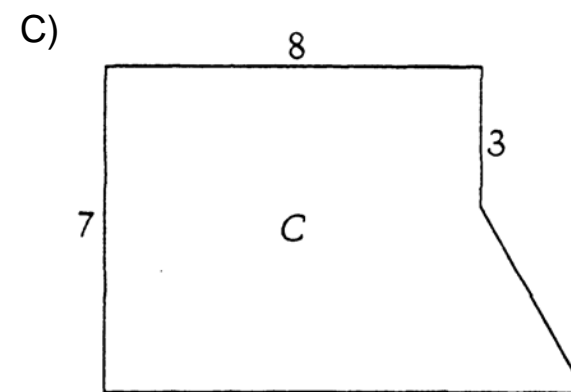
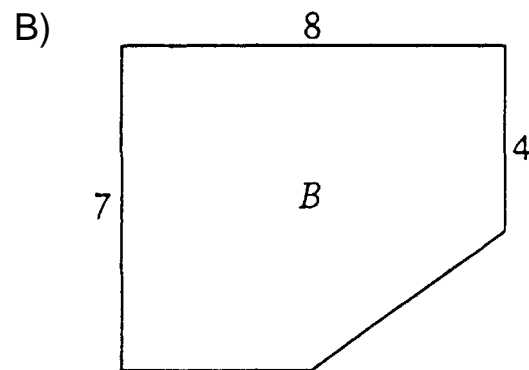
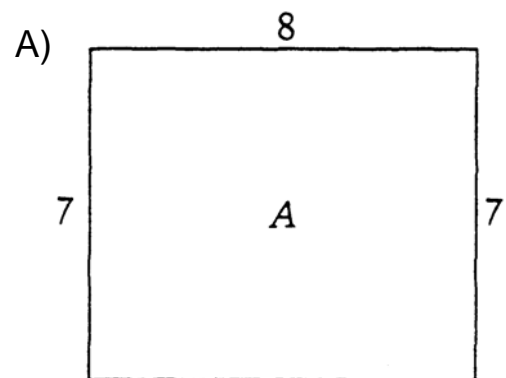


The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle? NBN1K4

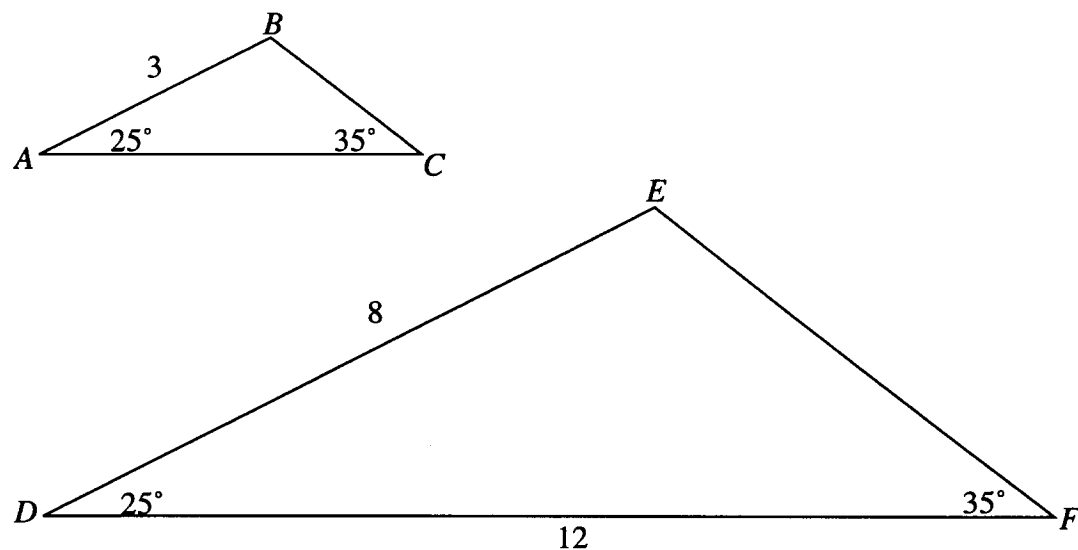
- A) 70
- B) 275
- C) 985
- D) 25,880
- E) 98,420

16. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1014



17. Triangles ABC and DEF are similar triangles.



What is the length of side AC ?

- A) 2
- B) 4
- C) 4.5
- D) 5.5
- E) 32

GCT1P9

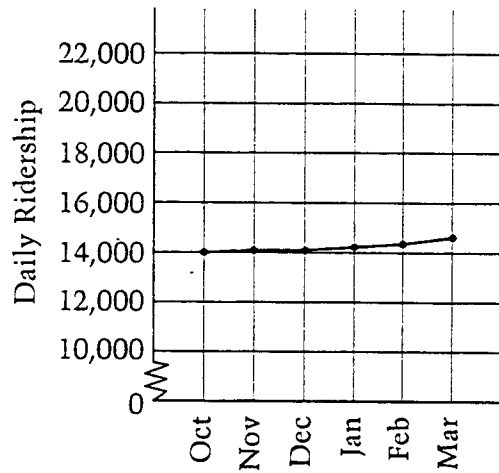
This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

18.

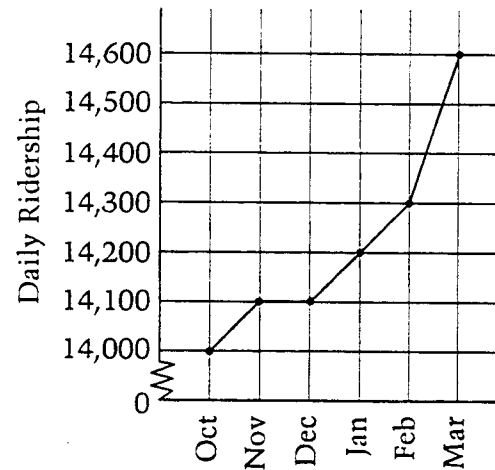
| METRO RAIL COMPANY | |
|--------------------|-----------------|
| Month | Daily Ridership |
| October | 14,000 |
| November | 14,100 |
| December | 14,100 |
| January | 14,200 |
| February | 14,300 |
| March | 14,600 |

The data in the table above has been correctly represented by both graphs shown below.

Graph A



Graph B



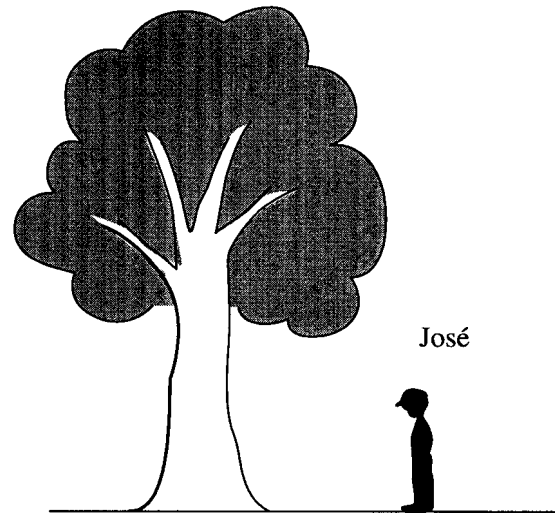
Which graph would be best to help convince others that the Metro Rail Company made a lot more money from ticket sales in March than in October?

SBP1L9

Explain your reason for making this selection

Why might people who thought that there was little difference between October and March ticket sales consider the graph you chose to be misleading?

19.



José is 1.5 m tall. About how tall is the tree?

- A) 4 m
- B) 6 m
- C) 8 m
- D) 10 m

GBT1L8

20. If $3(x + 5) = 30$, then $x =$

- A) 2
- B) 5
- C) 10
- D) 95

ABT1O7

21. The following two advertisements appeared in a newspaper in a country where the units of currency are *zeds*.

BUILDING A

Office space available
85 - 95 square meters
475 *zeds* per month
100 - 120 square meters

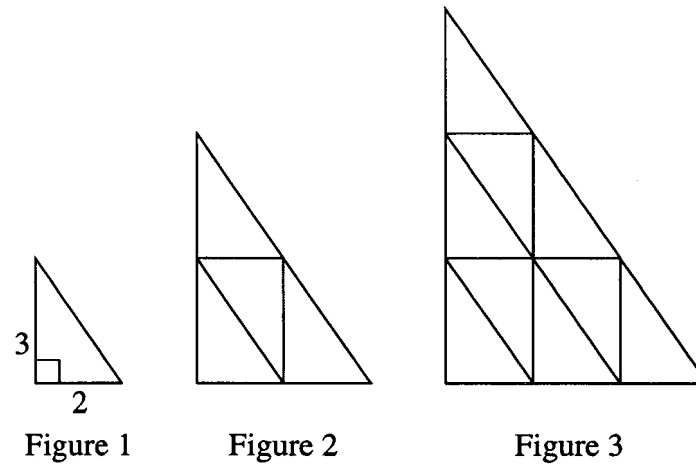
BUILDING B

Office space available
35 - 260 square meters
90 *zeds* per square
meter
per year

If a company is interested in renting an office of 110 square meters in that country for a year, at which office building, A or B, should they rent the office in order to get the lower price? Show your work.

SCT1V2

22. Here is a sequence of three similar triangles. All of the small triangles are congruent.



The sequence of similar triangles is extended to the 8th Figure. How many small triangles would be needed for Figure 8?

ACT1S1b

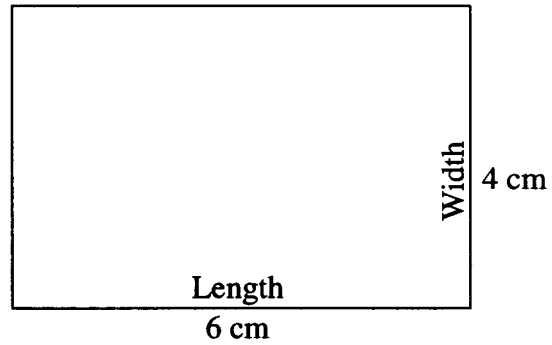
Answer _____

23. A straight line on a graph passes through the points (3, 2) and (4, 4). Which of these points also lies on the line?

ABT118

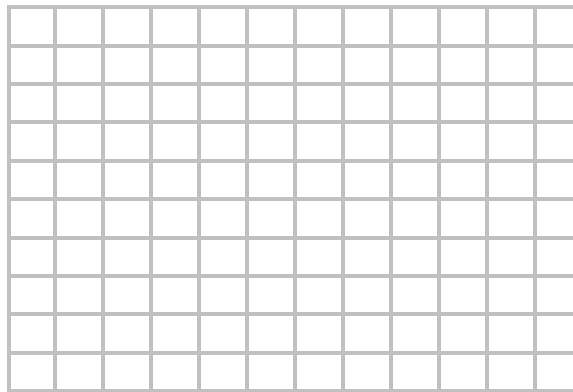
- A) (1, 1)
- B) (2, 4)
- C) (5, 6)
- D) (6, 3)
- E) (6, 5)

24.



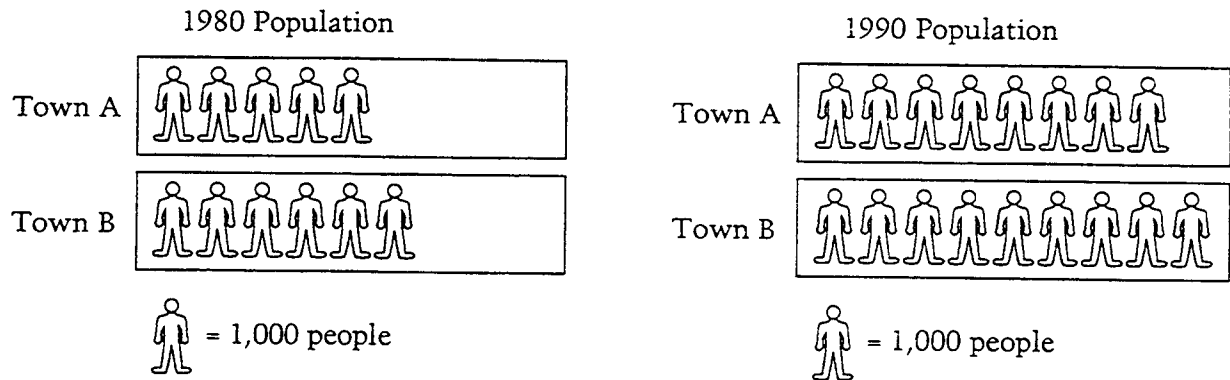
- a. In the space below, draw a new rectangle whose length is one and one half times the length of the rectangle above, and whose width is half the width of the rectangle above. Show the length and width of the new rectangle in centimeters on the figure.

GBT1U2a



- b. What is the ratio of the area of the new rectangle to the area of the first one?
Show your work.

GBT1U2b



25. In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

NBP1L5

Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount. Use mathematics to explain how Brian might have justified his claim.

Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.

26. $3^3 + 4(8 - 5) \div 6 =$

NCN1M4

- A) 6.5
- B) 11
- C) 27.5
- D) 29
- E) 34.16

27. Brad wanted to find three consecutive whole numbers that add up to 81. He wrote the equation $(n - 1) + n + (n + 1) = 81$. What does the n stand for ?

ACT111

- A) The least of the three whole numbers
- B) The middle whole number
- C) The greatest of the three whole numbers
- D) The difference between the least and greatest of the three whole numbers

Table N-1b
EA item details, Grade 7

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | | | | |
|------|---------|----------|------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|----------------------|------------|----------|--------------------------|--|
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | Class 2 | | | | Class 3 | | | | | | Performance category | Gr 8 p-val | Comments | | |
| | | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | | | | multiple complex methods | generalization |
| 1 | 1701001 | NBP1C5 | Tip Calc. | 1 | C | | MC | N | X | | | | 1 | 2 | 2 | | | | | | | | | | | | 1 | 38 | Identify appropriate operation (multiplication); use percent and decimals; select correct answer. |
| 2 | 1702001 | GAT1J17 | Oxford to Smithville | 1 | C | | MC | G | X | | | | 2 | | 1 | | | | | | | | | | | | 1 | 66 | Estimate distance on a map using a given scale; select correct answer. |
| 3 | 1703001 | SBT1K7 | Blue Pen | 1 | C | | MC | S | X | | | | 2 | 1 | | | | | 2 | | | | | | | | 1 | 53 | Interpret a ratio in a probability context; select correct answer. |
| 4 | 1704001 | AAN1K1 | k+6 | 1 | E | | MC | A | | X | | | 1 | | 2 | | | | | | | | | | | | 1 | 72 | Interpret a problem situation using variable and infinity; select correct answer. |
| 5 | 1705001 | NCP1C13 | Carla's& Maria's tiles | 1 | | | CR | N | | X | | | | 2 | | | | | | 1 | 2 | | | | | | 2 | 28 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer; complete explanation. |
| 5 | 1705002 | NCP1C13 | Carla's& Maria's tiles | 0.75 | | | CR | N | | X | | | | 2 | | | | | | 1 | 2 | | | | | | 2 | | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer with relevant explanation. |
| 5 | 1705003 | NCP1C13 | Carla's& Maria's tiles | 0.5 | | | CR | N | | X | | | | 2 | | | | | | 1 | 2 | | | | | | 1 | | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer with partially correct, or incomplete, relevant explanation. |
| 5 | 1705004 | NCP1C13 | Carla's& Maria's tiles | 0.25 | | | CR | N | | X | | | | 2 | | | | | | 1 | 2 | | | | | | 1 | | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer but provide example. |

Table N-2
EA item details, Grade 7

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | | |
|------|---------|----------|--------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------|--|--|
| | | | | | | | | | | | Class 1 | | | | Class 2 | | | | Class 3 | | | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sign Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 6 | 1706001 | ABT1P10 | 4m | 1 | B | MC | A | | X | | | 1 | | | | 2 | | | 2 | | | | | | | | 1 | 58 | Simplify algebraic expression; select correct response |
| 7 | 1707001 | SBT1O5 | Red/Blue Cube | 1 | D | MC | S | X | | | | | 2 | 1 | | | | | 2 | | | | | | | | 1 | 47 | Interpret a ratio in a probability context; select correct answer. |
| 8 | 1708001 | NBN1E7 | Jill's Trip | 1 | | 7 | CR | N | X | | | | 1 | | | | | 2 | | 2 | | | | | | 2 | 59 | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in weeks. | |
| 8 | 1708002 | NBN1E7 | Jill's Trip | 1 | | 8 | CR | N | X | | | | 1 | | | | | 2 | | 2 | | | | | | 2 | | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in days. | |
| 9 | 1709001 | SBT1R8 | Car Speed/Stopping Dist. | 1 | B | MC | S | X | | | | | | | 2 | | | | 1 | | | | | | | 1 | 49 | Interpret a graphical representation (line graph); select correct answer. | |
| 10 | 1710001 | GBN1M5 | Square/Circle Area | 1 | B | MC | G | | | X | | | 1 | 2 | | | | | 2 | 2 | | | | | | 2 | 29 | Calculate area of square and circle; calculate difference; select correct answer. | |
| 11 | 1711001 | ABT1L11 | Dropped Ball | 1 | C | MC | A | | X | | | | 2 | | | | 1 | | 2 | | | | | | | 2 | 34 | Model a problem situation; calculate distance (addition); use whole numbers and decimals; select correct answer. | |
| 12 | 1712001 | NBT1I2 | Tourists on Bus | 1 | C | MC | N | | X | | | | 1 | | 2 | | | 2 | | 2 | | | | | | 1 | 58 | Identify appropriate series of arithmetic calculations (multiplication, subtraction); use whole numbers and fractions; provide correct answer. | |
| 13 | 1713001 | SBT1C18 | Batteries | 1 | D | MC | S | | X | | | | 2 | 2 | 2 | | | 2 | 1 | | | | | | | 2 | 36 | Interpret a problem situation; make inferences about a population based on a sample; use ratio; select correct answer. | |

Table N-3
EA item details, Grade 7

| Item | | | | Response Format | | | | | Degree of Formalization | | Competency Classes | | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | |
|------|---------|----------|-------------------------|-----------------|--------------------|-----------|-------------|--------|-------------------------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------------|------------|---|--|
| | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sign Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 14 | 1714001 | SCN1M3 | Sit-ups scatterplot | 1 | D | | MC | S | | X | | | | 1 | | | | | 2 | | | | | | | | 1 | 23 | Interpret a graphical representation; determine median value; select correct answer. |
| 15 | 1715001 | NBN1K4 | Radio Sales | 1 | B | | MC | N | | | X | | 2 | 2 | | 2 | | | 1 | | | | | | | | 2 | 31 | Interpret circle graph; use fractions and whole numbers; select correct answer. |
| 16 | 1716001 | GBN1O14 | Perimeter Shapes | 1 | B | | MC | G | | X | | 2 | 1 | | | | | 2 | | | | | | | | 1 | 32 | Use given dimensions to estimate perimeters of irregular polygons; identify polygon that fits given criteria; select correct answer. | |
| 17 | 1717001 | GCT1P9 | Ratio Similar Triangles | 1 | C | | MC | G | | | X | 2 | 2 | 1 | | | | | | | | | | | | 2 | 38 | Use properties of similar triangles; calculate length of side; select correct answer. | |
| 18 | 1718001 | SBP1L9 | Metro Rail | 1 | | | CR | S | | | X | | | | | | | | 1 | | | | | 2 | | 3 | 26 | Critically analyze two graphical representations of data; recognize differences in scales; draw correct conclusion; provide justification | |
| 18 | 1718002 | SBP1L9 | Metro Rail | 0.66 | | | CR | S | | | X | | | | | | | | 1 | | | | | 2 | | 2 | | 26 | Critically analyze two graphical representations of data; draw correct conclusion; provide incomplete justification |
| 18 | 1718003 | SBP1L9 | Metro Rail | 0.33 | | | CR | S | | | X | | | | | | | | 1 | | | | | 2 | | 2 | | 26 | Critically analyze two graphical representations of data; draw correct conclusion; provide incorrect or no justification |
| 19 | 1719001 | GBT1L8 | Jose's Tree | 1 | B | | MC | G | X | | | 2 | | | | | | 1 | | | | | | | | 1 | 60 | Interpret a problem situation; identify a non-standard unit; determine height; select correct answer. | |

Table N-4
EA item details, Grade 7

| Item | | | | Response Format | | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments |
|------|---------|----------|-----------|-----------------|--------------------|-----------|-------------|--------|-------------------------|------------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------------------|------------|--|
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sign Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | |
| | | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 20 | 1720001 | ABT1O7 | 3(x+5)=30 | 1 | B | | MC | A | | X | | 1 | 2 | | | | | | | | | | | | | | 1 | 72 | Solve an equation; use the distributive property; select correct answer. |
| 21 | 1721001 | SCT1V2 | Zeds | 1 | | 30 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 2 | 19 | Calculate costs given two different rates and units; compare annual or monthly rates; provide correct answer. |
| 21 | 1721002 | SCT1V2 | Zeds | 1 | | 39 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 2 | | Calculate and compare costs given two different rates and units; alternative approach |
| 21 | 1721003 | SCT1V2 | Zeds | 0.66 | | 20 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 2 | | Correctly calculate costs for only one of two different rates and units; provide correct answer |
| 21 | 1721004 | SCT1V2 | Zeds | 0.66 | | 21 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 2 | | Correctly calculate costs for two different rates and units; provide incorrect answer or do not provide final answer |
| 21 | 1721005 | SCT1V2 | Zeds | 0.33 | | 10 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 1 | | Provide correct answer; calculation or explanation incorrect or inadequate. |
| 21 | 1721006 | SCT1V2 | Zeds | 0.33 | | 11 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 1 | | Provide correct answer; no work shown. |
| 21 | 1721007 | SCT1V2 | Zeds | 0.33 | | 12 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 1 | | Correctly calculate costs for only one of two different rates and units; provide incorrect answer. |
| 21 | 1721008 | SCT1V2 | Zeds | 0.33 | | 16 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 1 | | Provide correct answer; provide information from problem context without accompanying mathematical justification. |
| 21 | 1721009 | SCT1V2 | Zeds | 0.33 | | 19 | CR | S | | X | | | 2 | | 2 | | | | 1 | 2 | | | | | | | 1 | | Provide correct answer; minimal explanation of solution method. |

Table N-5
EA item details, Grade 7

| Item | | | | Response Format | | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | |
|------|---------|----------|------------------------|-----------------|--------------------|-----------|-------------|--------|-------------------------|------------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------------------|------------|----------|--|
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sigy Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | | |
| 22b | 1722201 | ABT1S1b | Similar Triangles (b) | 1 | | 10 | CR | A | | X | | | | | | | | 2 | 1 | | | | | | | | 2 | 1 | 26 | Interpret a pattern demonstrated in diagrams; extend the pattern to the 8th figure; provide correct answer. |
| 23 | 1723001 | ABT1I8 | Points on Line | 1 | C | | MC | A | | X | | 1 | | | | | | 2 | | | | | | | | | | 2 | 41 | Identify a point on a line, given two other points on the line; select correct answer. |
| 24a | 1724101 | GBT1U2a | Draw Rectangle | 1 | | 20 | CR | G | X | | | 2 | 2 | | | | | 1 | 2 | | | | | | | | | 1 | 31 | Draw rectangle as specified; use operations with fractions; record dimensions; provide correct answer. |
| 24a | 1724102 | GBT1U2a | Draw Rectangle | 0.5 | | 10 | CR | G | X | | | 2 | 2 | | | | | 1 | 2 | | | | | | | | | 1 | | Determine dimensions of a rectangle as specified; use operations with fraction; incorrect or missing drawing. |
| 24a | 1724103 | GBT1U2a | Draw Rectangle | 0.5 | | 11 | CR | G | X | | | 2 | 2 | | | | | 1 | 2 | | | | | | | | | 1 | | Draw rectangle as specified; use operations with fractions; provide incorrect dimension(s) or do not provide dimension(s). |
| 24b | 1724201 | GBT1U2b | Rectangle Ratio (area) | 1 | | 20 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | 10 | Calculate areas of rectangles; write correct ratio for a problem situation |
| 24b | 1724202 | GBT1U2b | Rectangle Ratio (area) | 1 | | 21 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; write a ratio for a problem situation |
| 24b | 1724203 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 10 | CR | G | | X | | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio for a problem situation (invert ratio) |

Table N-6
EA item details, Grade 7

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | |
|------|---------|----------|------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------------|------------|----------|---|
| | | | | | | | | | | | Class 1 | | | | | Class 2 | | | | | Class 3 | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sign Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 24b | 1724204 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 11 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | Calculate areas of rectangles; write an incorrect ratio or provide no ratio. |
| 24b | 1724205 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 12 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | Calculate areas of rectangles; calculate difference between areas. |
| 24b | 1724206 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 13 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | Calculate areas of rectangles based on incorrect answer to Part A; write incorrect ratio or provide no ratio. |
| 24b | 1724207 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 14 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | | 1 | Calculate areas of rectangles based on incorrect answer to Part A; calculate difference between areas. |
| 25 | 1725001 | NBP1L5 | Town Populations | 1 | | | CR | N | | | X | | 2 | | | | | 2 | 1 | | | | | | | | | 2 | 11 interpret numerical data graphical representations (pictograph); calculate absolute and relative comparisons; justify both solutions |
| 25 | 1725002 | NBP1L5 | Town Populations | 0.5 | | | CR | N | | | X | | 2 | | | | | 2 | 1 | | | | | | | | | 1 | Use numerical and graphical representations (pictograph); calculate absolute or relative comparisons; justify solution or lack detail in mathematical justifications. |
| 26 | 1726001 | NCN1M4 | Order of Operations | 1 | D | | MC | N | | | X | | 2 | | 1 | 2 | | | | | | | | | | | | 1 | 22 Evaluate an expression using the order of operations; select correct answer. |
| 27 | 1727001 | ACT1I1 | What is "n" | 1 | B | | MC | A | | | X | 1 | | 2 | | | | | 2 | | | | | | | | | 2 | 37 Demonstrate understanding of variable; select correct answer. |

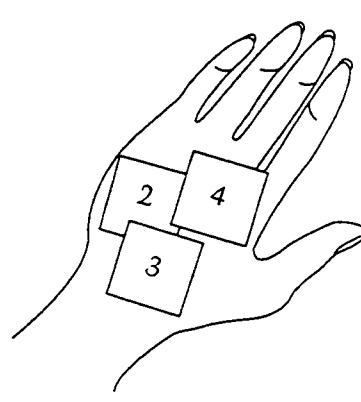
Table P-1a
EA item details, Grade 8

1. In a game, Carla and Maria are making subtraction problems using tiles numbered 1 to 5. The player whose subtraction problem gives the largest answer wins the game.

Look at where each girl placed her two tiles.

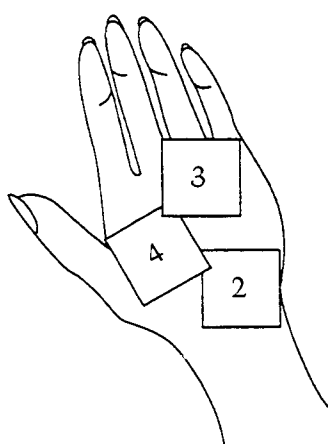
Carla

| | | |
|---|---|--|
| 1 | | |
| - | 5 | |



Maria

| | | |
|---|--|---|
| | | 5 |
| - | | 1 |



Who will win the game? _____

Explain how you know this person will win.

NCP1C13

2. If m represents a positive number, which of these is equivalent to $m + m + m + m$?

ABT1P10

- A) $m + 4$
- B) $4m$
- C) m^4
- D) $4(m + 1)$

3. Each of the six faces of a certain cube is painted either red or blue. When the cube is tossed, the probability of the cube landing with a red face up is $\frac{2}{3}$. How many faces are red?

SBT1O5

- A) One
- B) Two
- C) Three
- D) Four
- E) Five

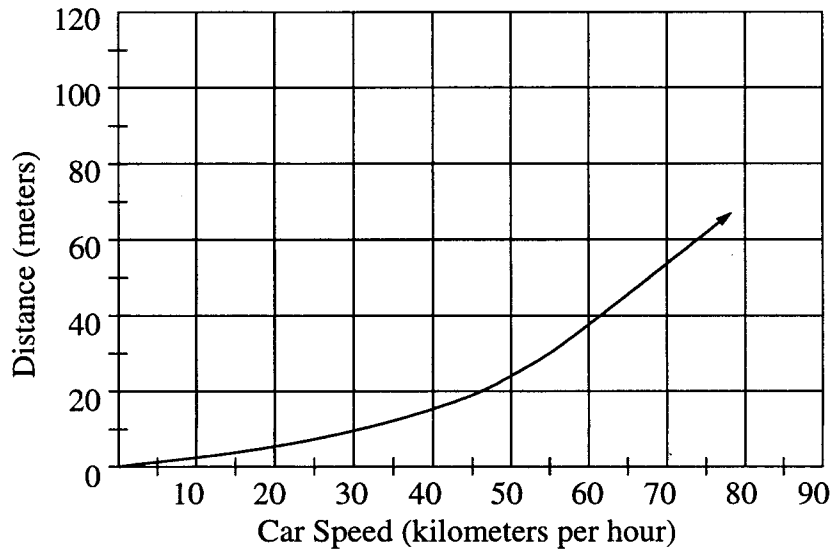
4. Jill needs to earn \$45.00 for a class trip. She earns \$2.00 each day on Mondays, Tuesdays, and Wednesdays, and \$3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earn \$45.00 ?

NBN1E7

Answer: _____

5. The graph below shows the distance traveled before coming to a stop after the brakes are applied for a typical car traveling at different speeds.

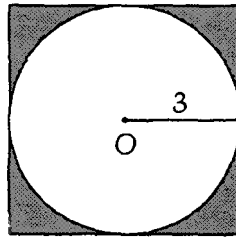
SBT1R8



A car is traveling 80km per hour. About how far will the car travel after the brakes are applied?

- A) 60 m B) 70 m C) 85 m D) 100 m

6.



In the figure above, a circle with center O and radius of length 3 is inscribed in a square. What is the area of the shaded region?

GBN1M5

- A) 3.86
 B) 7.73
 C) 28.27
 D) 32.86
 E) 36.00

7. A rubber ball rebounds to half the height it drops. If the ball is dropped from a rooftop 18 m above the ground, what is the total distance traveled by the time it hits the ground the third time?

ABT1L11

- A) 31.5 m
- B) 40.5 m
- C) 45 m
- D) 63 m

8. Two groups of tourists each have 60 people. If $\frac{3}{4}$ of the first group and $\frac{2}{3}$ of the second group board buses to travel to a museum, how many more people in the first group board buses than in the second group?

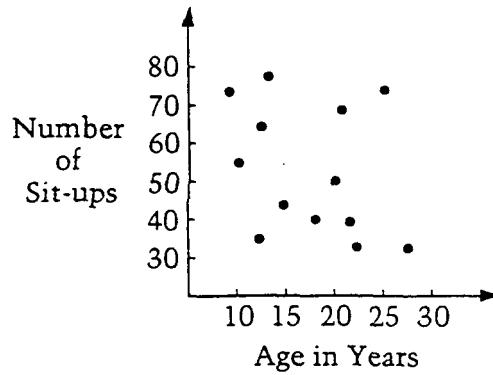
NBT112

- A) 2 B) 4 C) 5 D) 40 E) 45

9. From a shipment of 500 batteries, a sample of 25 was selected at random and tested. If 2 batteries in the sample were found to be dead, how many dead batteries would be expected in the entire shipment?

SBT1C18

- A) 10
- B) 20
- C) 30
- D) 40
- E) 50



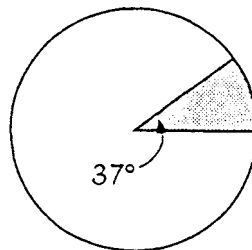
10. In the graph above, each dot shows the number of sit-ups and the corresponding age for one of the 13 people. According to this graph, what is the median number of sit-ups for these 13 people?

SCN1M3

- A) 15
- B) 20
- C) 45
- D) 50
- E) 55

11.

RADIO SALES



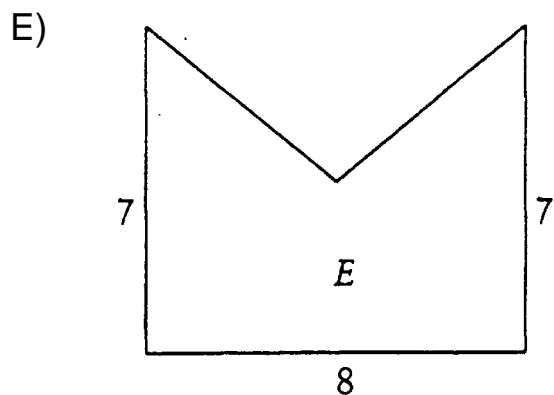
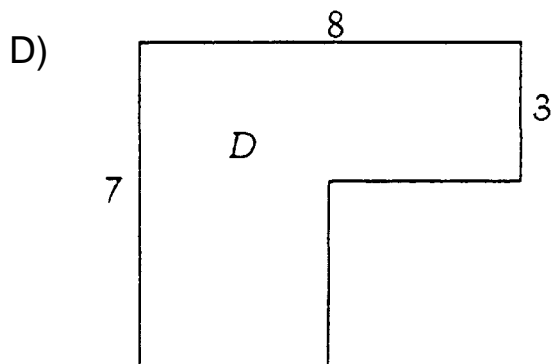
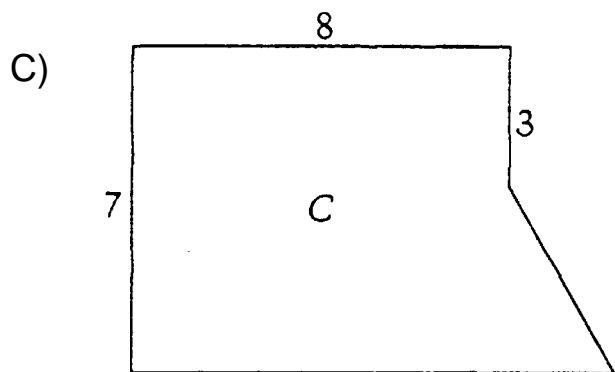
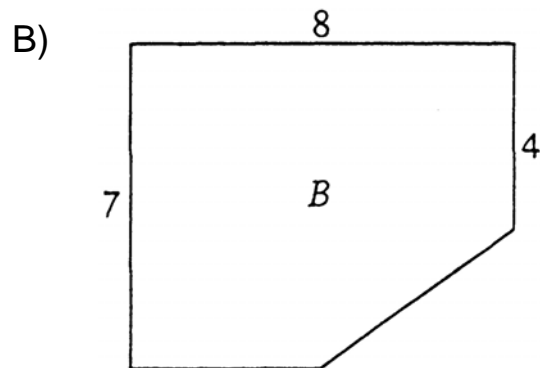
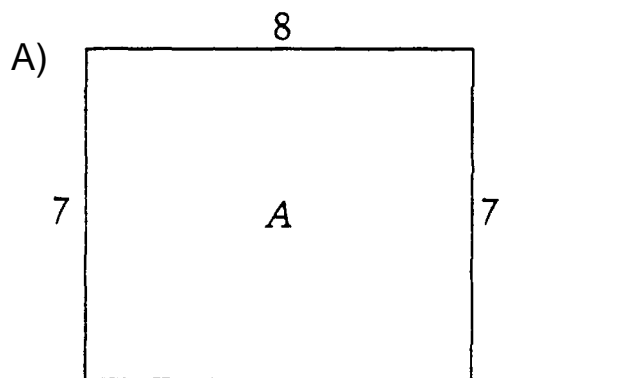
The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle?

NBN1K4

- A) 70
- B) 275
- C) 985
- D) 25,880
- E) 98,420

12. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1014

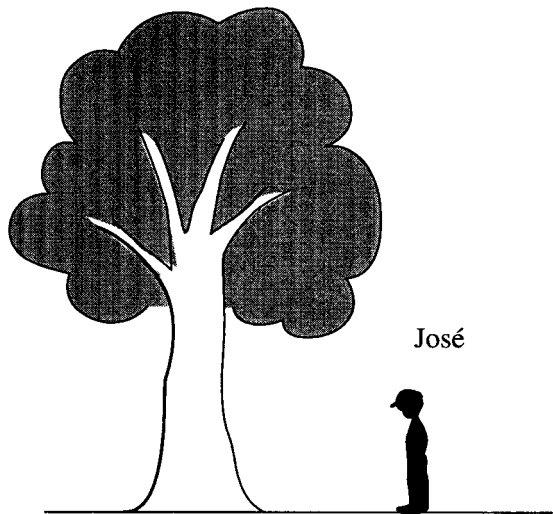


13. A drawer contains 28 pens; some white, some blue, some red, and some gray. If the probability of selecting a blue pen is $\frac{2}{7}$, how many blue pens are in the drawer?

SBT1K7

- A) 4
- B) 6
- C) 8
- D) 10
- E) 20

14.



José is 1.5 m tall. About how tall is the tree?

GBT1L8

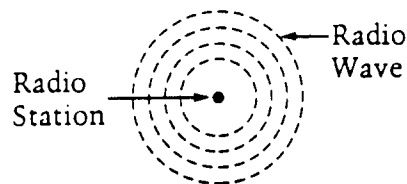
- A) 4 m
- B) 6 m
- C) 8 m
- D) 10 m

This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answers should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

15. Radio station KMAT in Math City is 200 miles from radio station KGEO in Geometry City. Highway 7, a straight road, connects the two cities.

GCN1E13

KMAT broadcasts can be received up to 150 miles in all directions from the station and KGEO broadcasts can be received up to 125 miles in all directions. Radio waves travel from each radio station through the air, as represented below.



On the next page, draw a diagram that shows the following.

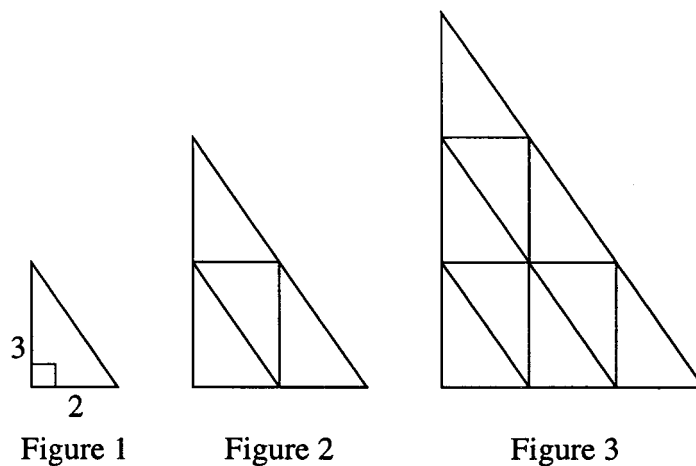
- Highway 7
- The location of the two radio stations
- The part of Highway 7 where both radio stations can be received

Be sure to label the distances along the highway and the length in miles of the part of the highway where both stations can be received.

Student work for problem #15



16. Here is a sequence of three similar triangles. All of the small triangles are congruent.



The sequence of similar triangles is extended to the 8th Figure. How many small triangles would be needed for Figure 8?

ACT1S1b

Answer _____

17. If $3(x + 5) = 30$, then $x =$

ABT1O7

- A) 2
- B) 5
- C) 10
- D) 95

18. The following two advertisements appeared in a newspaper in a country where the units of currency are *zeds*.

BUILDING A

Office space available

85 - 95 square meters

475 *zeds* per month

100 - 120 square meters

BUILDING B

Office space available

35 - 260 square meters

90 *zeds* per square
meter
per year

If a company is interested in renting an office of 110 square meters in that country for a year, at which office building, A or B, should they rent the office in order to get the lower price? Show your work.

SCT1V2

19. Of the following, which is the closest approximation of a 15 percent tip on a restaurant check of \$24.99?

NBP1C5

- A) \$2.50
- B) \$3.00
- C) \$3.75
- D) \$4.50
- E) \$5.00

20. A straight line on a graph passes through the points (3, 2) and (4, 4). Which of these points also lies on the line?

ABT118

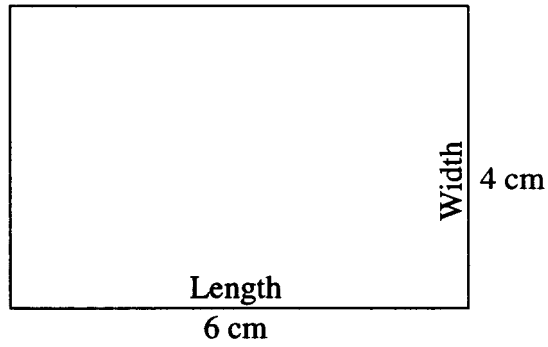
- A) (1, 1)
- B) (2, 4)
- C) (5, 6)
- D) (6, 3)
- E) (6, 5)

21. $3^3 + 4(8 - 5) \div 6 =$

NCN1M4

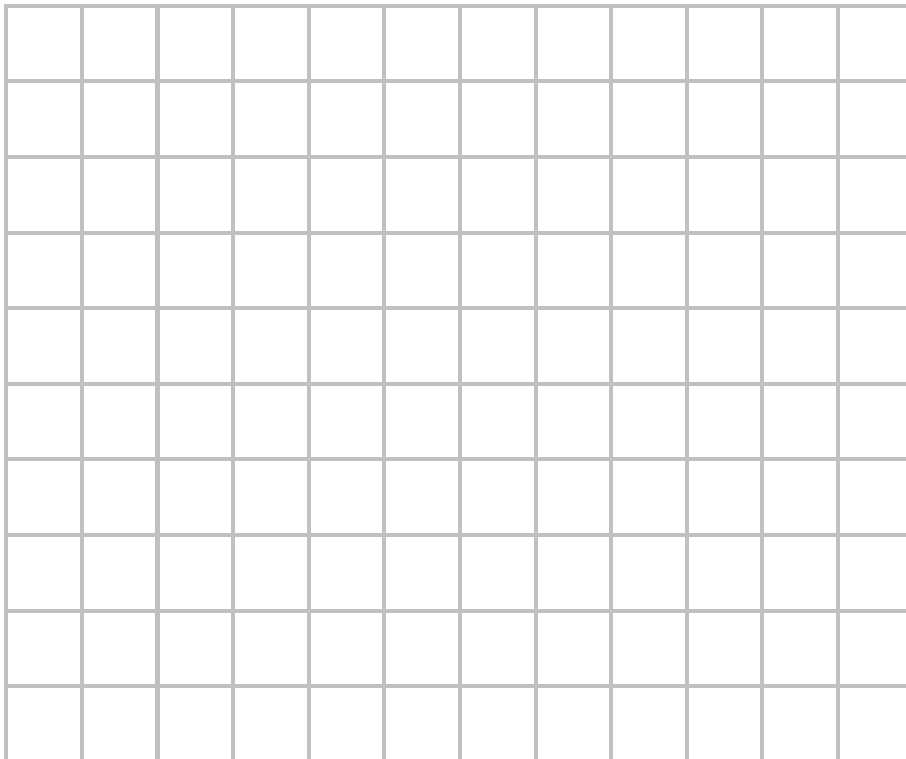
- A) 6.5
- B) 11
- C) 27.5
- D) 29
- E) 34.16

22.



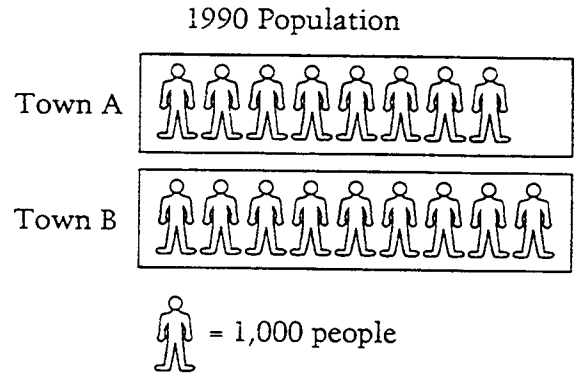
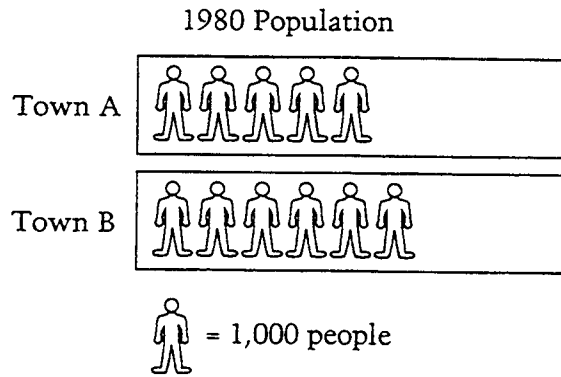
- a. In the space below, draw a new rectangle whose length is one and one half times the length of the rectangle above, and whose width is half the width of the rectangle above. Show the length and width of the new rectangle in centimeters on the figure.

GBT1U2a



- b. What is the ratio of the area of the new rectangle to the area of the first one?
Show your work.

GBT1U2b



23. In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount. Use mathematics to explain how Brian might have justified his claim.

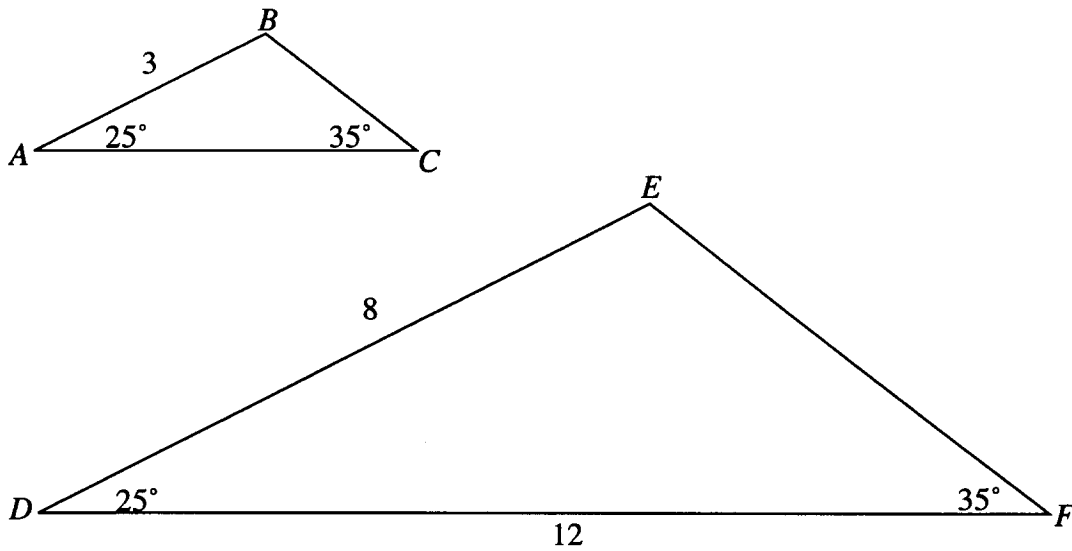
Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.

24. Brad wanted to find three consecutive whole numbers that add up to 81. He wrote the equation $(n - 1) + n + (n + 1) = 81$. What does the n stand for ?

ACT111

- A) The least of the three whole numbers
- B) The middle whole number
- C) The greatest of the three whole numbers
- D) The difference between the least and greatest of the three whole numbers

25. Triangles ABC and DEF are similar triangles.



What is the length of side AC ?

GCT1P9

- A) 2
- B) 4
- C) 4.5
- D) 5.5
- E) 32

This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

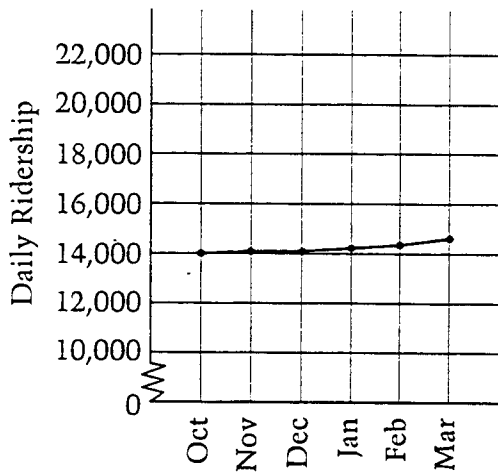
26.

METRO RAIL COMPANY

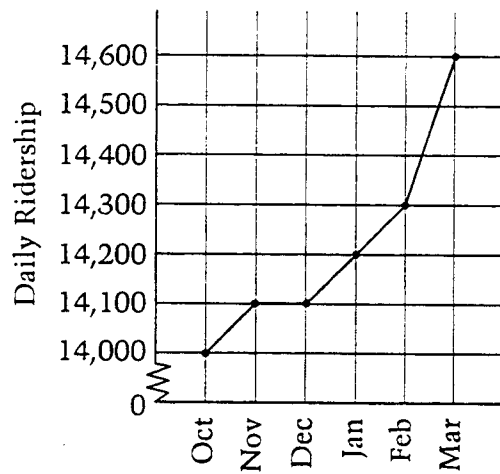
| Month | Daily Ridership |
|----------|-----------------|
| October | 14,000 |
| November | 14,100 |
| December | 14,100 |
| January | 14,200 |
| February | 14,300 |
| March | 14,600 |

The data in the table above has been correctly represented by both graphs shown below.

Graph A



Graph B



Which graph would be best to help convince others that the Metro Rail Company made a lot more money from ticket sales in March than in October?

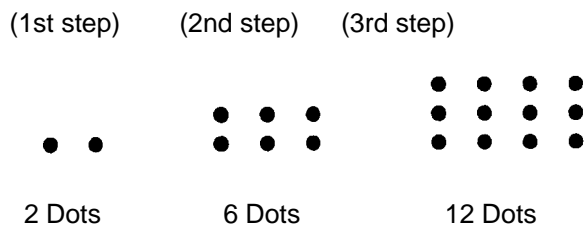
SBP1L9

Explain your reason for making this selection

Why might people who thought that there was little difference between October and March ticket sales consider the graph you chose to be misleading?

This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answers should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

27. A pattern of dots is shown below. At each step, more dots are added to the pattern. The number of dots added at each step is more than the number added in the previous step. The pattern continues infinitely.



Marcy has to determine the number of dots in the 20th step, but she does not want to draw all 20 pictures and then count the dots.

Explain or show how she could do this and give the answer that Marcy should get for the number of dots.

ACN1K9

Table P-1b
EA item details, Grade 8

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | | | | | | |
|------|---------|----------|------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|----------------------|------------|----------|--------------------------|----------------|--|
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | Class 2 | | | Class 3 | | | | | | | Performance category | Gr 8 p-val | Comments | | | |
| | | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | | | | multiple complex methods | generalization | |
| 1 | 1801001 | NCP1C13 | Carla's& Maria's tiles | 1 | | | CR | N | | X | | | | 2 | | | | | 1 | 2 | | | | | | | | 2 | 28 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer; complete explanation. |
| 1 | 1801002 | NCP1C13 | Carla's& Maria's tiles | 0.75 | | | CR | N | | X | | | | 2 | | | | | 1 | 2 | | | | | | | | 2 | 28 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer with relevant explanation. |
| 1 | 1801003 | NCP1C13 | Carla's& Maria's tiles | 0.5 | | | CR | N | | X | | | | 2 | | | | | 1 | 2 | | | | | | | | 1 | 28 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer with partially correct, or incomplete, relevant explanation. |
| 1 | 1801004 | NCP1C13 | Carla's& Maria's tiles | 0.25 | | | CR | N | | X | | | | 2 | | | | | 1 | 2 | | | | | | | | 1 | 28 | Speculate various outcomes in a nonspecific subtraction problem; provide correct answer but provide example. |
| 2 | 1802001 | ABT1P10 | 4m | 1 | B | | MC | A | | X | | | 1 | | | | | | | 2 | | | | | | | | 1 | 58 | Simplify algebraic expression; select correct response. |
| 3 | 1803001 | SBT1O5 | Red/Blue Cube | 1 | D | | MC | S | X | | | | | 2 | 1 | | | | | 2 | | | | | | | | 1 | 47 | Interpret a ratio in a probability context; select correct answer. |
| 4 | 1804001 | NBN1E7 | Jill's Trip | 1 | | 7 | CR | N | X | | | | | 1 | | | | | | 2 | | | | | | | | 2 | 59 | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in weeks. |
| 4 | 1804002 | NBN1E7 | Jill's Trip | 1 | | 8 | CR | N | X | | | | | 1 | | | | | | 2 | | | | | | | | 2 | 59 | Identify appropriate series of arithmetic calculations; use whole dollar amounts; provide correct answer in days. |

Table P-2
EA item details, Grade 8

| Item | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | | | |
|------|---------|----------|-----------------|--------------------|------------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------|----|---|--|
| # | ACER ID | Ref Code | Score Points | Mult. Choice Resp. | Siggy Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | | Class 2 | | | | Class 3 | | | | | | | | | | |
| | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | | |
| 5 | 1805001 | SBT1R8 | 1 | B | | MC | S | X | | | | | | | | | | | | | | | | | | 1 | 49 | Interpret a graphical representation (line graph); select correct answer. | |
| 6 | 1806001 | GBN1M5 | 1 | B | | MC | G | | | X | | | 1 | 2 | | | | | | | | | | | | | 2 | 29 | Calculate area of square and circle; calculate difference; select correct answer. Model a problem situation; calculate distance (addition); use whole numbers and decimals; select correct answer. |
| 7 | 1807001 | ABT1L11 | 1 | C | | MC | A | | X | | | | 2 | | | 1 | | 2 | | | | | | | | | 2 | 34 | Identify appropriate series of arithmetic calculations (multiplication, subtraction); use whole numbers and fractions; select correct answer. |
| 8 | 1808001 | NBT1I2 | 1 | C | | MC | N | | X | | | | 1 | | 2 | | | 2 | | 2 | | | | | | | 1 | 58 | Interpret a problem situation; make inferences about a population based on a sample; use ratio; select correct answer. |
| 9 | 1809001 | SBT1C18 | 1 | D | | MC | S | | X | | | | 2 | 2 | 2 | | | 2 | 1 | | | | | | | | 2 | 36 | Interpret a graphical representation (scatter plot); determine median value; select correct answer. |
| 10 | 1810001 | SCN1M3 | 1 | D | | MC | S | | X | | | | | 1 | | | | 2 | | | | | | | | | 1 | 23 | Interpret circle graph; use fractions and whole numbers; select correct answer. Use given dimensions to estimate perimeters of irregular polygons; identify polygon that fits given criteria; select correct answer. |
| 11 | 1811001 | NBN1K4 | 1 | B | | MC | N | | | X | | | 2 | 2 | | 2 | | 1 | | | | | | | | | 2 | 31 | Interpret a ratio in a probability context; select correct answer. |
| 12 | 1812001 | GBN1O14 | 1 | B | | MC | G | | X | | | | 2 | 1 | | | | 2 | | | | | | | | | 1 | 32 | Interpret a ratio in a probability context; select correct answer. |
| 13 | 1813001 | SBT1K7 | 1 | C | | MC | S | X | | | | | 2 | 1 | | | | 2 | | | | | | | | | 1 | 53 | Interpret a ratio in a probability context; select correct answer. |

Table P-4
EA item details, Grade 8

| Item | | | | Response Format | | | | Degree of Formalization | | | Competency Classes | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | | | | |
|------|---------|----------|---------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|------------|--------------------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------|----------|--|---|----|---|
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Sigy Code | Item Format | Domain | Informal | Pre-formal | Formal | Class 1 | | | | Class 2 | | | | Class 3 | | | | | | | | | | | |
| | | | | | | | | | | | | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | | | |
| 18 | 1818001 | SCT1V2 | Zeds | 1 | | 30 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 2 | 19 | Calculate costs given two different rates and units; compare annual or monthly rates; provide correct answer. |
| 18 | 1818002 | SCT1V2 | Zeds | 1 | | 39 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 2 | 19 | Calculate and compare costs given two different rates and units; alternative approach. |
| 18 | 1818003 | SCT1V2 | Zeds | 0.66 | | 20 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 2 | 19 | Correctly calculate costs for only one of two different rates and units; provide correct answer. |
| 18 | 1818004 | SCT1V2 | Zeds | 0.66 | | 21 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 2 | 19 | Correctly calculate costs for two different rates and units; provide incorrect answer or do not provide final answer. |
| 18 | 1818005 | SCT1V2 | Zeds | 0.33 | | 10 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 1 | 19 | Provide correct answer; calculation or explanation incorrect or inadequate. |
| 18 | 1818006 | SCT1V2 | Zeds | 0.33 | | 11 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 1 | 19 | Provide correct answer; no work shown. |
| 18 | 1818007 | SCT1V2 | Zeds | 0.33 | | 12 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 1 | 19 | Correctly calculate costs for only one of two different rates and units; provide incorrect answer. |
| 18 | 1818008 | SCT1V2 | Zeds | 0.33 | | 16 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 1 | 19 | Provide correct answer; provide information from problem context without accompanying mathematical justification. |
| 18 | 1818009 | SCT1V2 | Zeds | 0.33 | | 19 | CR | S | | X | | | | 2 | | 2 | | | | | | | | | | | | | 1 | 19 | Provide correct answer; minimal explanation of solution method. |
| 19 | 1819001 | NBP1C5 | Tip Calc. | 1 | C | | MC | N | X | | | | | 1 | 2 | 2 | | | | | | | | | | | | | 1 | 38 | Identify appropriate operation (multiplication); use percent and decimals; select correct answer. |
| 20 | 1820001 | ABT1I8 | Points on Line | 1 | C | | MC | A | | | x | 1 | | | | | | | | | | | | | | | | | 2 | 41 | Identify a point on a line, given two other points on the line; select correct answer. |
| 21 | 1821001 | NCN1M4 | Order of Operations | 1 | D | | MC | N | | | X | | | 2 | | 1 | 2 | | | | | | | | | | | | 1 | 22 | Evaluate an expression using the order of operations; select correct answer. |

Table P-5
EA item details, Grade 8

| Item | | | | Response Format | | | | Degree of Formalization | | Competency Classes | | | | | | | | | | | | | | | | Performance category | Gr 8 p-val | Comments | |
|------|---------|----------|------------------------|-----------------|--------------------|-----------|-------------|-------------------------|----------|--------------------|--------|-------------------------|--------------|------------|--------------------|------------|----------|-----------------|----------------------------|-------------------------------|----------------|------------|-----------------------|----------------------|--------------------------|----------------------|------------|----------|--|
| | | | | | | | | | | Class 1 | | | | Class 2 | | | | Class 3 | | | | | | | | | | | |
| # | ACER ID | Ref Code | Name | Score Points | Mult. Choice Resp. | Stgy Code | Item Format | Domain | Informal | Pre-formal | Formal | standard representation | computations | definition | routine procedures | one method | modeling | problem solving | interpretation, reflection | multiple well-defined methods | problem posing | reflection | original mathematical | mathematical insight | multiple complex methods | generalization | | | |
| 22a | 1822101 | GBT1U2a | Draw Rectangle | 1 | | 20 | CR | G | X | | | | 2 | 2 | | | | 1 | 2 | | | | | | | | 1 | 31 | Draw rectangle as specified; use operations with fractions; record dimensions; provide correct answer. |
| 22a | 1822102 | GBT1U2a | Draw Rectangle | 0.5 | | 10 | CR | G | X | | | | 2 | 2 | | | | 1 | 2 | | | | | | | | 1 | | Determine dimensions of a rectangle as specified; use operations with fractions; incorrect or missing drawing. |
| 22a | 1822103 | GBT1U2a | Draw Rectangle | 0.5 | | 11 | CR | G | X | | | | 2 | 2 | | | | 1 | 2 | | | | | | | | 1 | | Draw rectangle as specified; use operations with fractions; provide incorrect dimension(s) or do not provide dimension(s). |
| 22b | 1822201 | GBT1U2b | Rectangle Ratio (area) | 1 | | 20 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | 10 | Calculate areas of rectangles; write correct ratio for a problem situation |
| 22b | 1822202 | GBT1U2b | Rectangle Ratio (area) | 1 | | 21 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; write a ratio for a problem situation |
| 22b | 1822203 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 10 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio for a problem situation (invert ratio) |
| 22b | 1822204 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 11 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | | Calculate areas of rectangles; write an incorrect ratio or provide no ratio. |
| 22b | 1822205 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 12 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | | Calculate areas of rectangles; calculate difference between areas |
| 22b | 1822206 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 13 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; write incorrect ratio or provide no ratio |
| 22b | 1822207 | GBT1U2b | Rectangle Ratio (area) | 0.5 | | 14 | CR | G | | | X | 2 | 2 | 1 | 2 | | | | | | | | | | | | 1 | | Calculate areas of rectangles based on incorrect answer to Part A; calculate difference between areas. |

