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, Steinthorsdottir, & 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 *p* -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)

	5th grade		6th grade		7th grade	
Item type	**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 5^{th} 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					
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—														
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%
—Conventional—														
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					
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—														
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%
—Conventional—														
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					
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—														
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**
—MiC—			
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
—Conventional—			
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**
—MiC—			
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
—Conventional—			
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
	—MiC—		
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 1class *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							
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—																
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%
—Conventional—																
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							
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—																
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%
—Conventional—																
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	
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult			
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
							—MiC—									
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						Overall	
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult			
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—																
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 1class *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**
—MiC—			
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
—Conventional—			
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 Guggenhiem-Dillard 2 and Hirch 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**
—MiC—			
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
—Conventional—			
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, 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	**Comparable**	**Greater**
	—MiC—		
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 classses 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							
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—																
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%
—Conventional—																
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							
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult		Overall	
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%
—MiC—																
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%
—Conventional—																
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						Overall	
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult			
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	Percent
								—MiC—								
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						Overall	
	Number		Geometry		Algebra		Statistics		Easy		Anchor		Difficult			
	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	%	Mean	Percent
—MiC—																
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**
—MiC—			
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
—Conventional—			
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 Guggenhiem-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**
—MiC—			
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
—Conventional—			
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 *p*-value is		
	Below	**Comparable**	**Greater**
	—MiC—		
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 *p* -value is		
	Below	**Comparable**	**Greater**
	—MiC—		
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., Steinthorsdottir, 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, 3 0*(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
—MiC—																													
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
—Conventional—																													
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
Item Details																													
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 *p* -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
—MiC—																												
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
—Conventional—																												
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
Item Details																												
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 *p* -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
—MiC—																												
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
Item Details																												
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 *p* -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
—MiC—																													
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
—Conventional—																													
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	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
Item Details																													
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 *p* -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

		Item Number																												
School-Teacher (Class)	(*N*)	**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**
—MiC—																														
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	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
—Conventional—																														
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
Item Details																														
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 *p* -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

		Item Number																												
School-Teacher (Class)	(*N*)	**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**
—MiC—																														
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
Item Details																														
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 *p* -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
—MiC—																													
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
Item Details																													
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 *p* -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

		Item Number																												
School-Teacher (Class)	(*N*)	**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**
—MiC—																														
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-Donnely 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-Donnely 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-Donnely 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
—Conventional—																														
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	30.0	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
Item Details																														
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 *p* -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
—MiC—																													
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
—Conventional—																													
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
Item Details																													
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 *p* -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

		Item Number																											
School-Teacher (Class)	(*N*)	**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**
—MiC—																													
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
Item Details																													
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 *p* -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

		Item Number																											
School-Teacher (Class)	(*N*)	**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**
—MiC—																													
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
Item Details																													
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 *p* -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

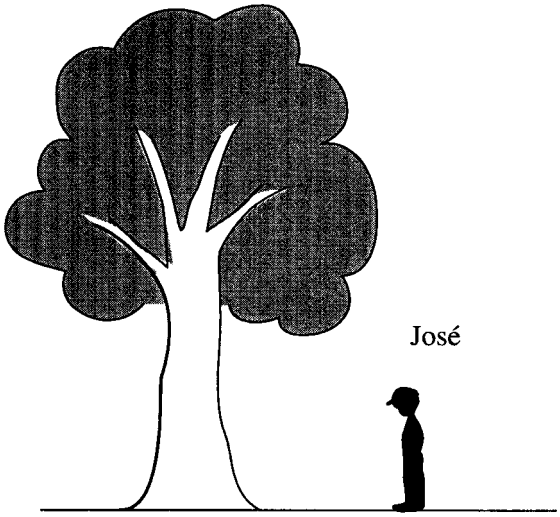
[b] E = Easy [mean grade 8 item *p*-value 64.0]
A = Anchor [40.0]
D = Difficult [24.2]

[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

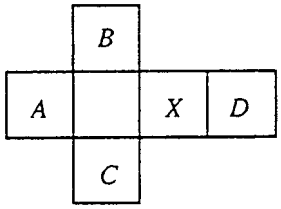
A) $4\frac{1}{3}$

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

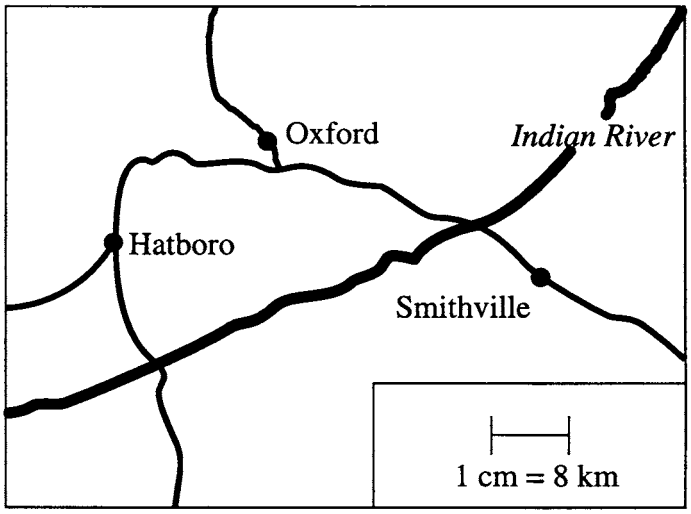
4. Three-fifths of the students in a class are girls. If 5 girls and 5 boys are added to the class, which statement is true of the class?

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?

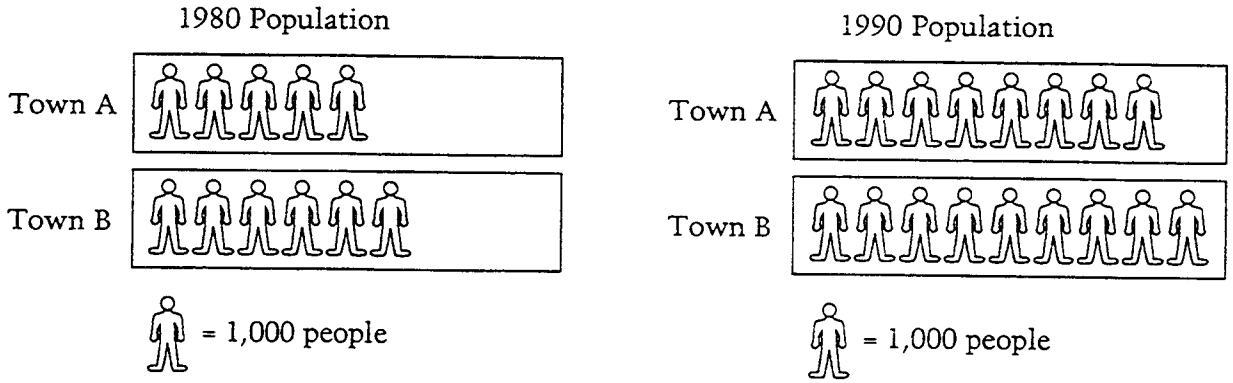
SBT1K7

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

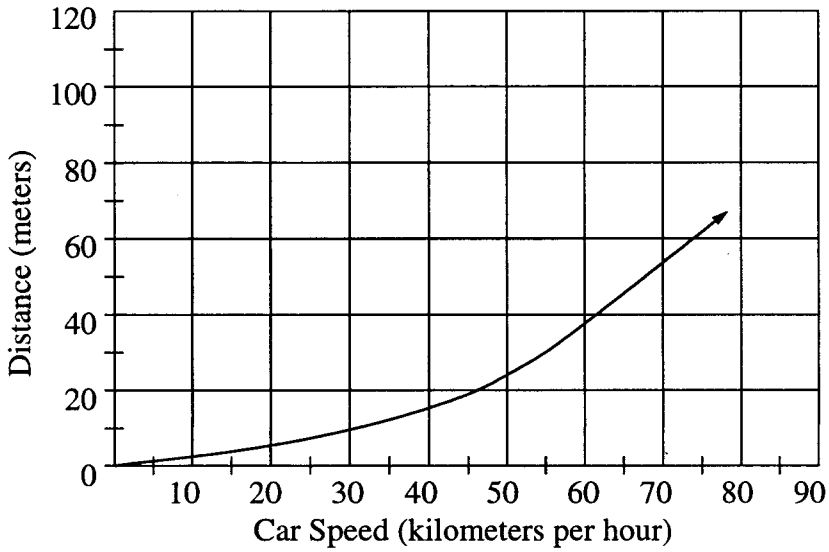
12. Jill needs to earn $45.00 for a class trip. She earns $2.00 each day on Mondays, Tuesdays, and Wednesdays, and $3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earns $45.00 ?

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.

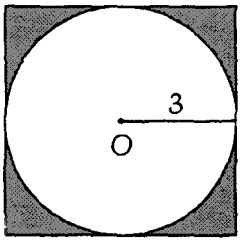
SBT1R8



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?

NBT1I2

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

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?

SBT1C18

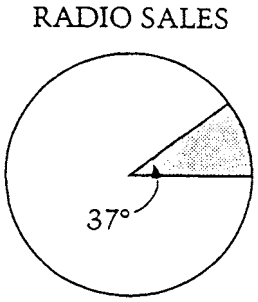
A) 10 B) 20 C) 30 D) 40 E) 50

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?

ABT1I8

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

19.



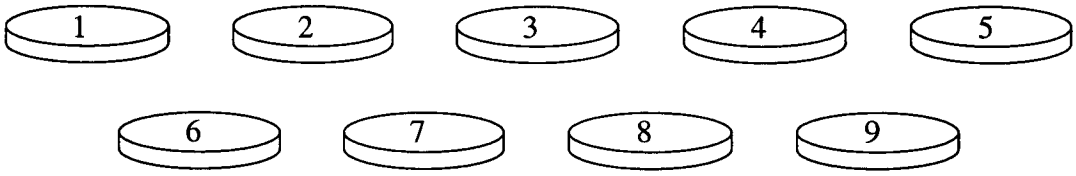
The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle?

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



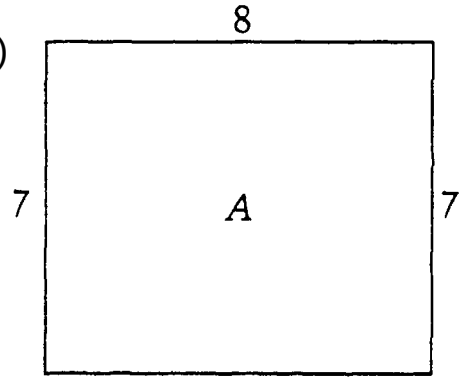
Madeleine draws one chip from the jar. What is the probability that Madeleine draws a chip with an even number?

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

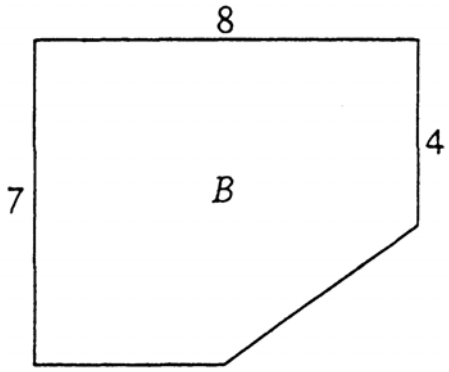
21. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1O14

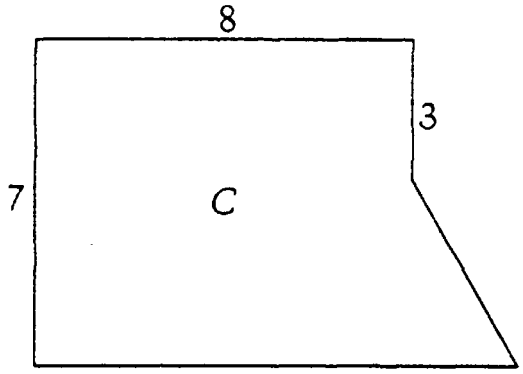
A)



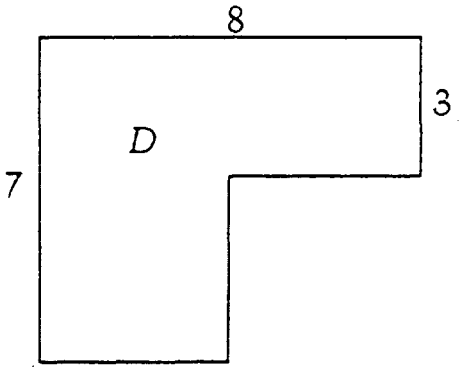
B)



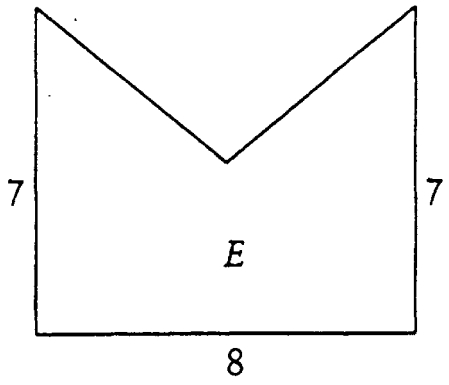
C)



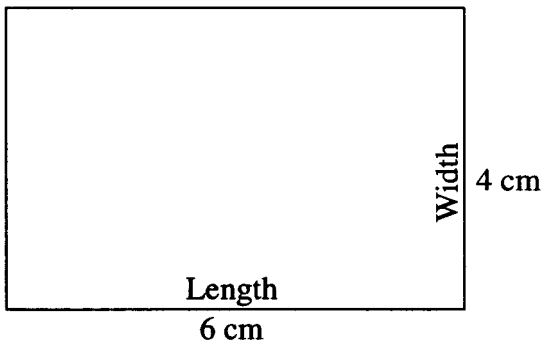
D)



E)



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

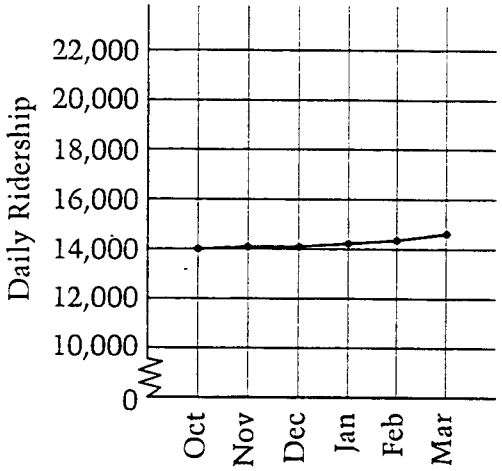
This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

23. METRO RAIL COMPANY

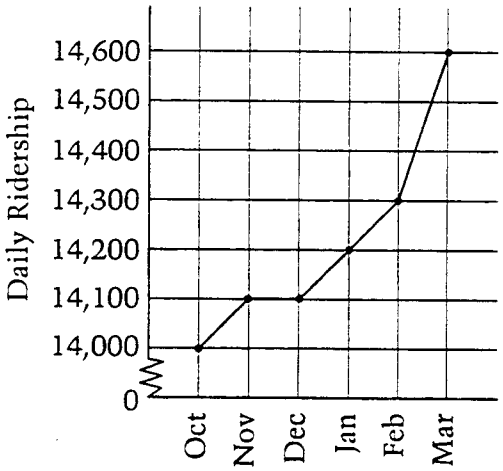
Month	Daily Ridership
October	14,000
November	14,100
December	14,100
January	14,200
February	14,300
March	14,600

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.

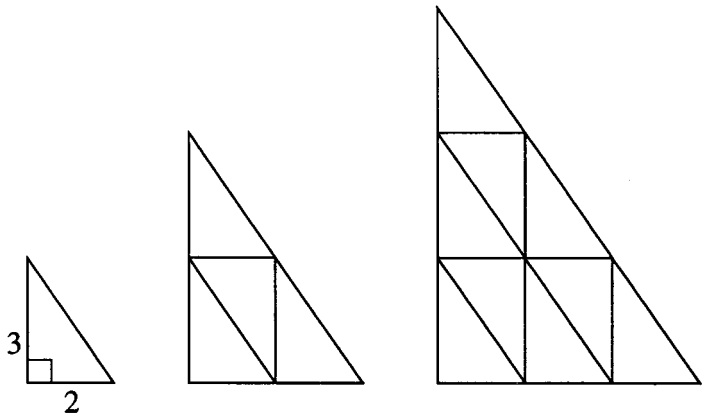


Figure 1 Figure 2 Figure 3

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																
												Class 1					Class 2				Class 3								
#	ACER ID	Ref Code	Name	Score Points	Mult Choice Resp	Sigy 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	Performance category	Gr 8 p-val	Comments
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																
												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	Performance category	Gr 8 p-val	Comments
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	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			
16	1516001	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.
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																		
												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	Performance category	Gr 8 p-val	Comments
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					2			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			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			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

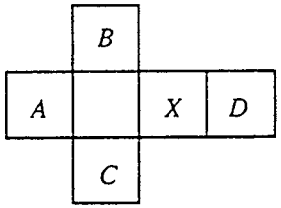
A) $4\frac{1}{3}$

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

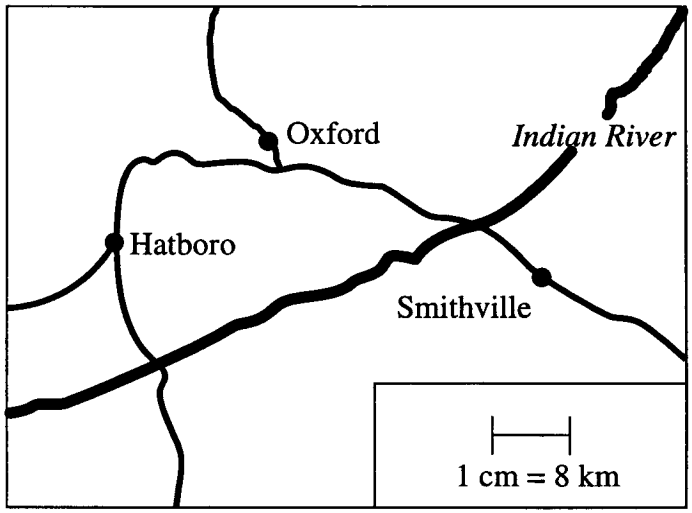
B) B

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?

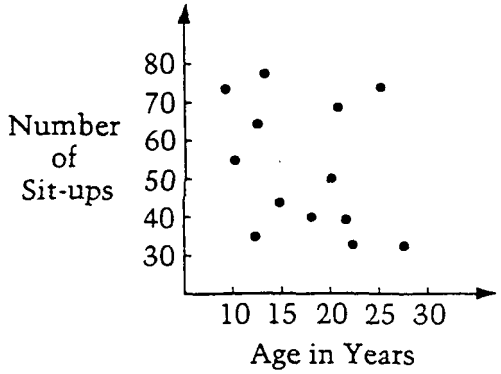
AAN1K1

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

6. 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



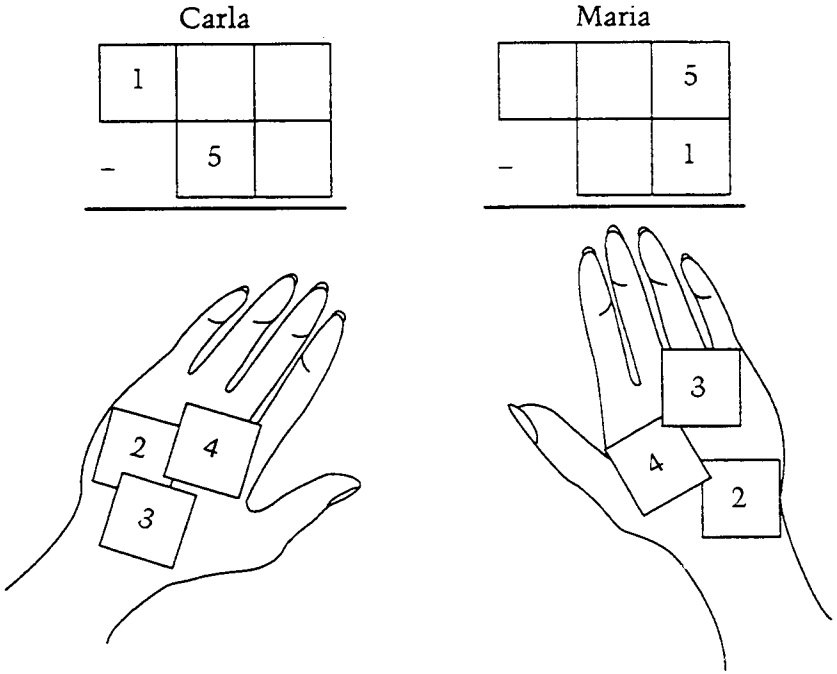
7. In the graph above, each dot shows the number of sit-ups and the corresponding age for one of the 13 people. According to this graph, what is the median number of sit-ups for these 13 people?

SCN1M3

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

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.



Who will win the game?_____

NCP1C13

Explain how you know this person will win.

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

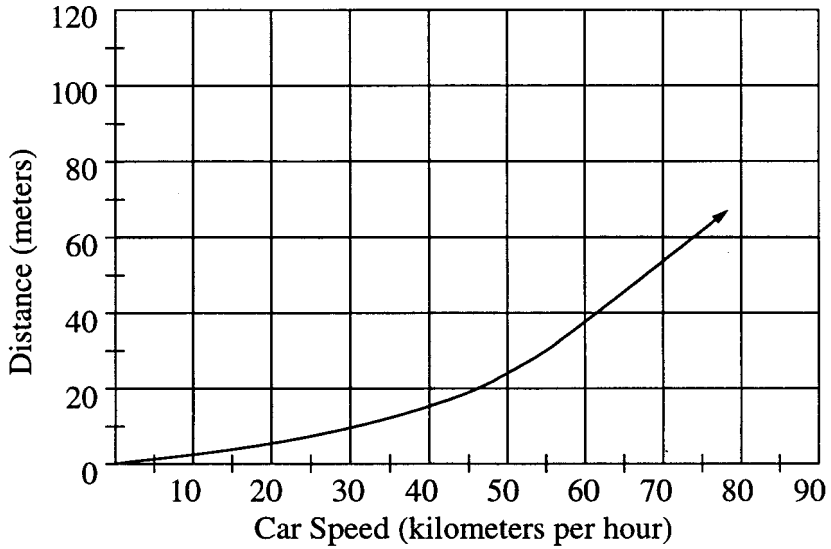
11. Jill needs to earn $45.00 for a class trip. She earns $2.00 each day on Mondays, Tuesdays, and Wednesdays, and $3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earns $45.00 ?

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.

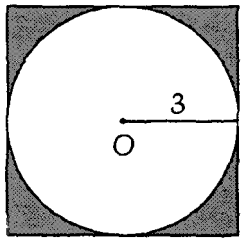
SBT1R8



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?

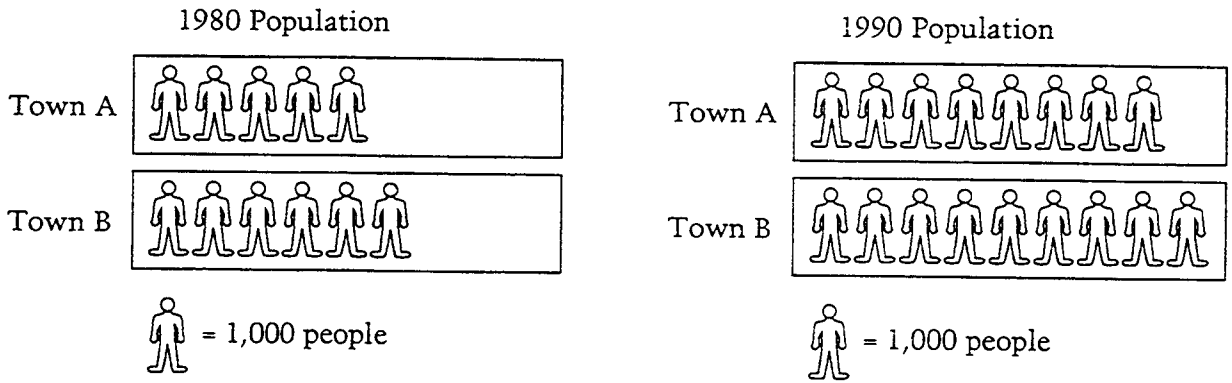
NBT1I2

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



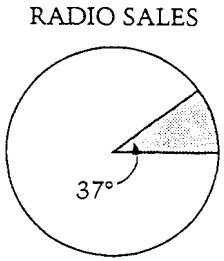
17. In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

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.

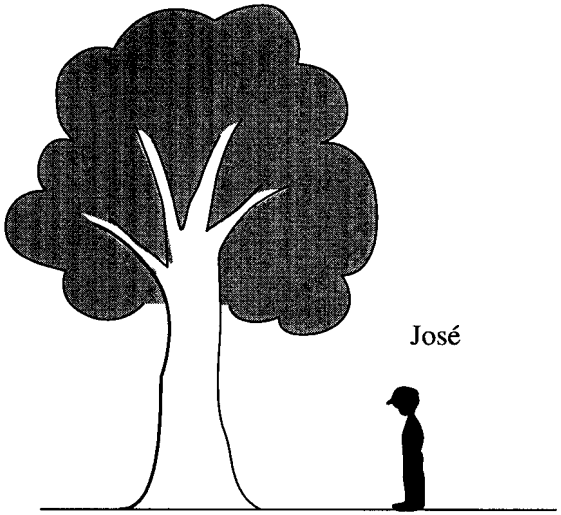
18.



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? GBT1L8

A) 4 m

B) 6 m

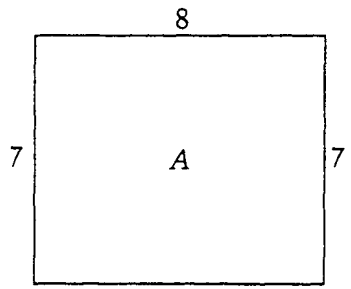
C) 8 m

D) 10 m

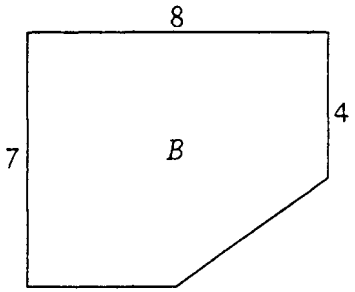
20. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1O14

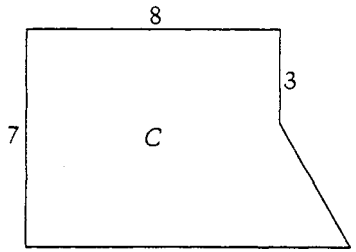
A)



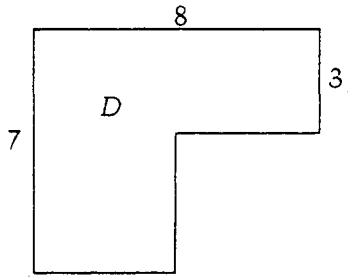
B)



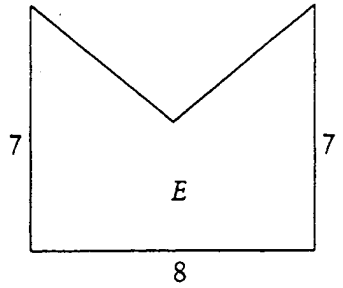
C)



D)

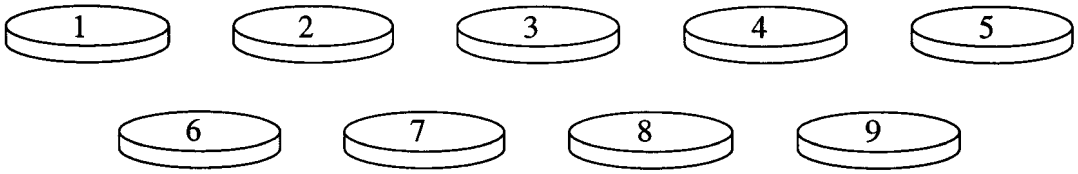


E)



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?

ABT1I8

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.

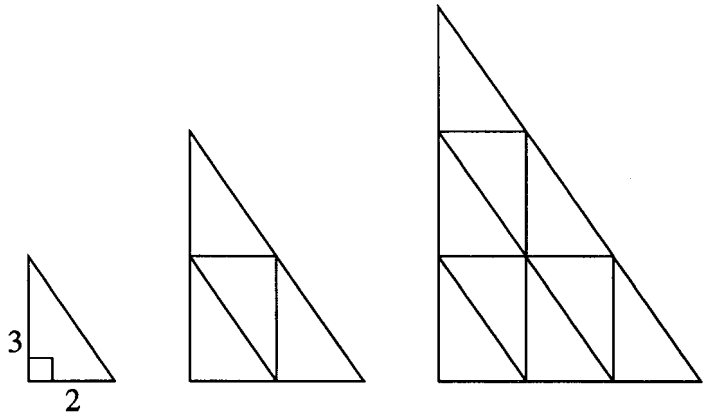


Figure 1 Figure 2 Figure 3

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

AAT1S1a

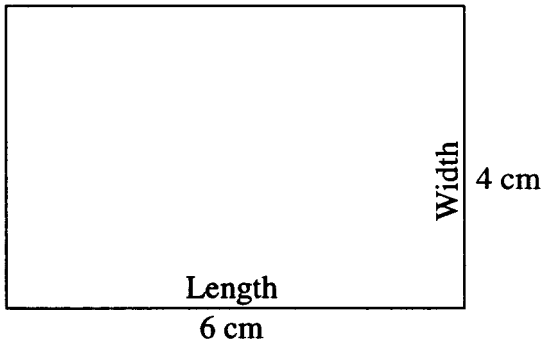
Figure	Number of small triangles
1	1
2	
3	

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

ACT1S1b

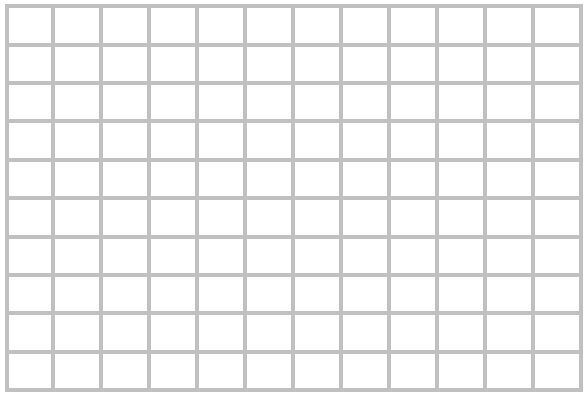
Answer_____

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

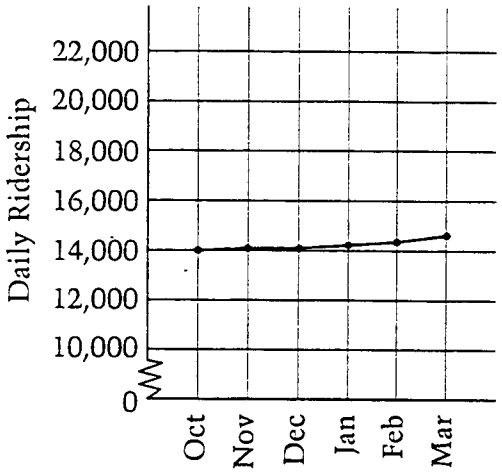
This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

26. METRO RAIL COMPANY

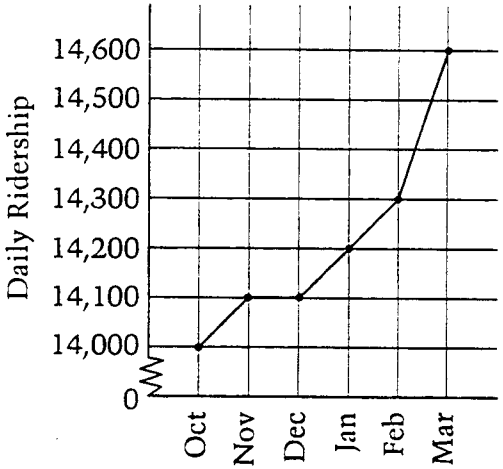
Month	Daily Ridership
October	14,000
November	14,100
December	14,100
January	14,200
February	14,300
March	14,600

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																	
												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	Performance category	Gr 8 p-val	Comments
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	Interpet 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																	
												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	Performance category	Gr 8 p-val	Comments
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																		
												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	Performance category	Gr 8 p-val	Comments
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 of 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																	
												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	Performance category	Gr 8 p-val	Comments
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

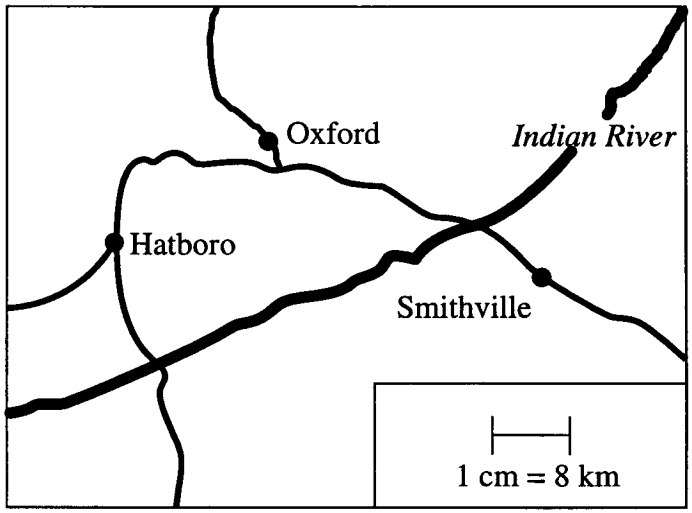
Item				Response Format					Degree of Formalization			Competency Classes																		
												Class 1					Class 2				Class 3										
#	ACER ID	Ref Code	Name	Score Points	Mult. Choice Resp.	Stgy Code	Item Format	Domain	Informal	Pre-formal	Formal	standard representation	computations	definition	routine procedures	one method	modeling	problem solving	interpretation, reflection	multiple well-defined methods	problem posing	reflection	original mathematical	mathematical insight	multiple complex methods	generalization	Performance category	Gr 8 p-val	Comments
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					2			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			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			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

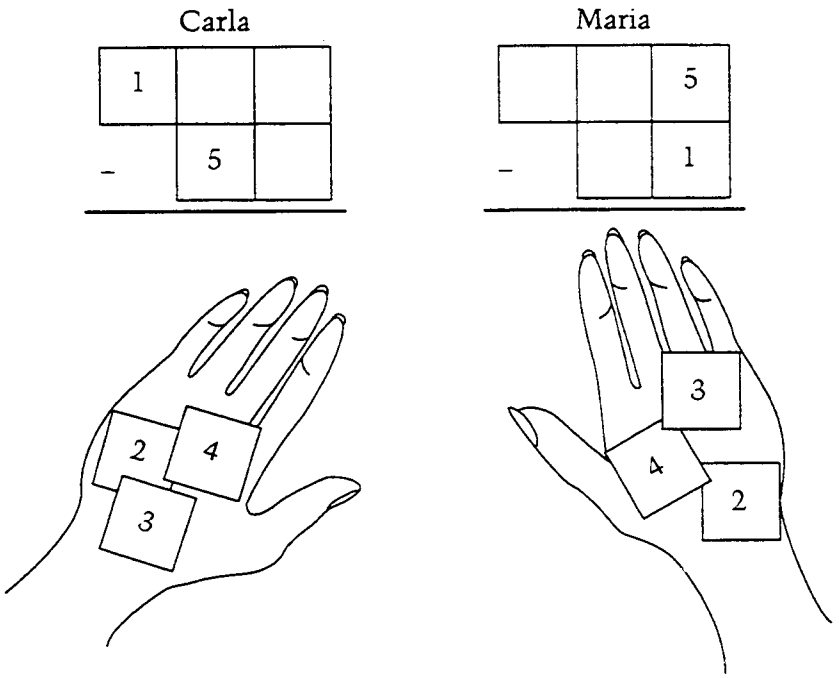
4. If k can be replaced by any number, how many different values can the expression $k + 6$ have?

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.



Who will win the game?_____

NCP1C13

Explain how you know this person will win.

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

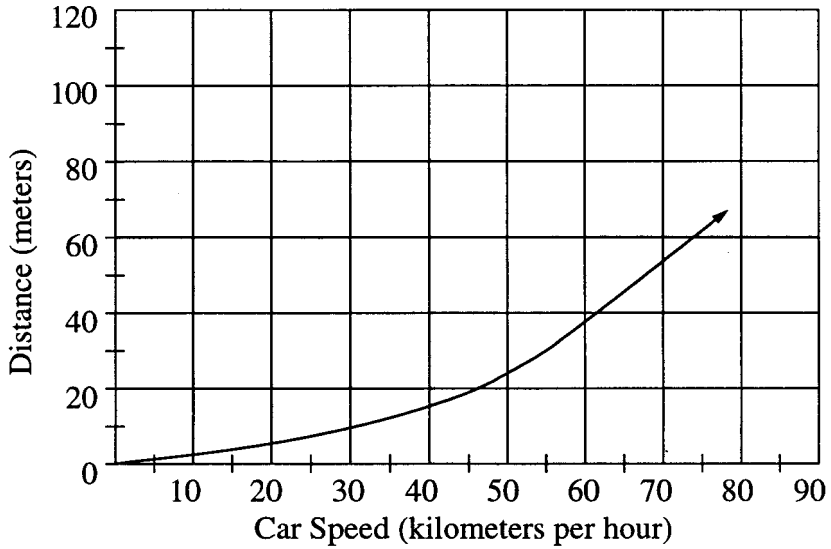
E) Five

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 earns $45.00 ?

NBN1E7

Answer:_____

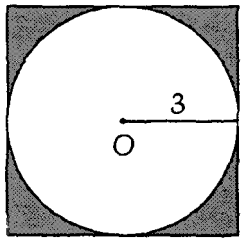
9. The graph below shows the distance traveled before coming to a stop after the brakes are applied for a typical car traveling at different speeds.
SBT1R8



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

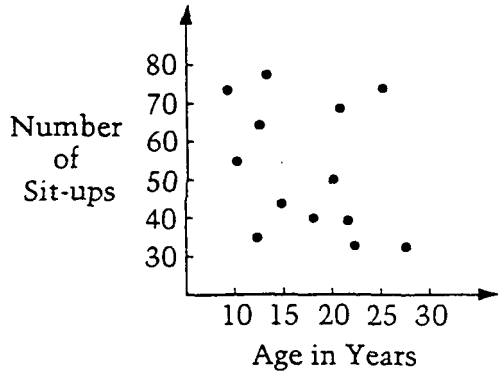
A) 31.5 m
B) 40.5 m
C) 45 m
D) 63 m

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

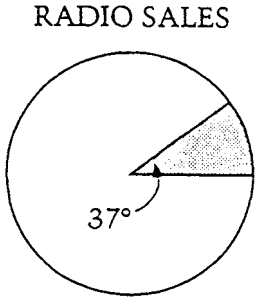
A) 10
B) 20
C) 30
D) 40
E) 50



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.



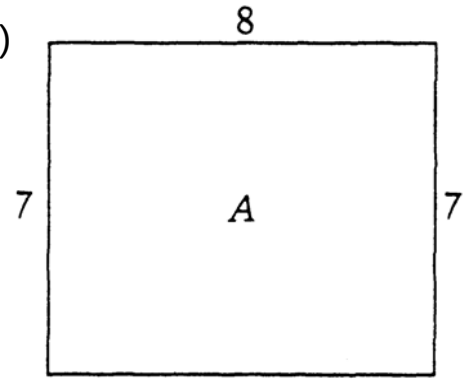
The entire circle shown above represents a total of 2,675 radios sold. Of the following, which is the best approximation of the number of radios represented by the shaded sector of the circle? NBN1K4

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

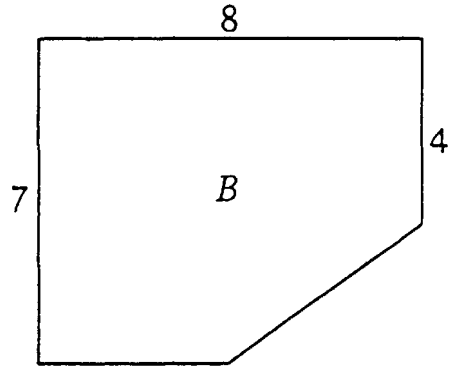
16. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1O14

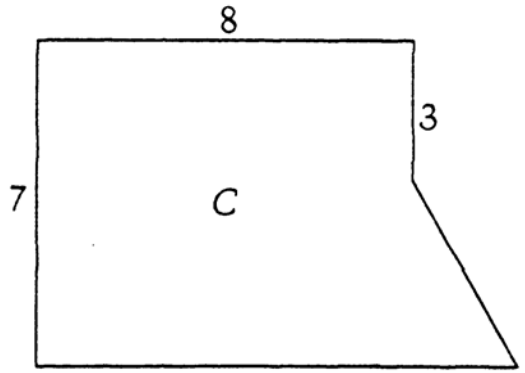
A)



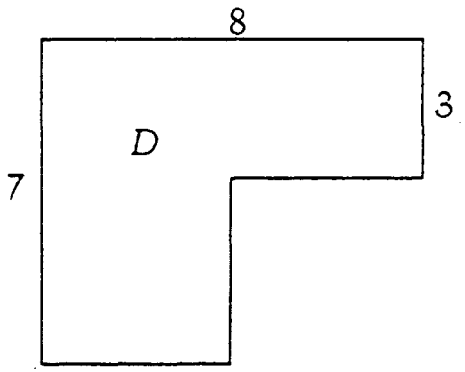
B)



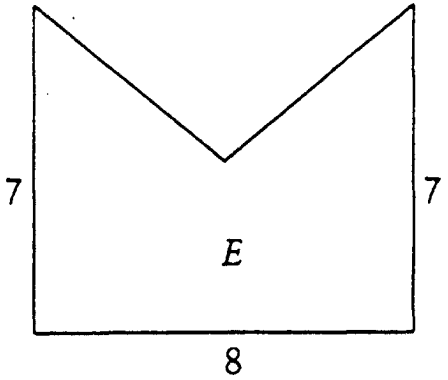
C)



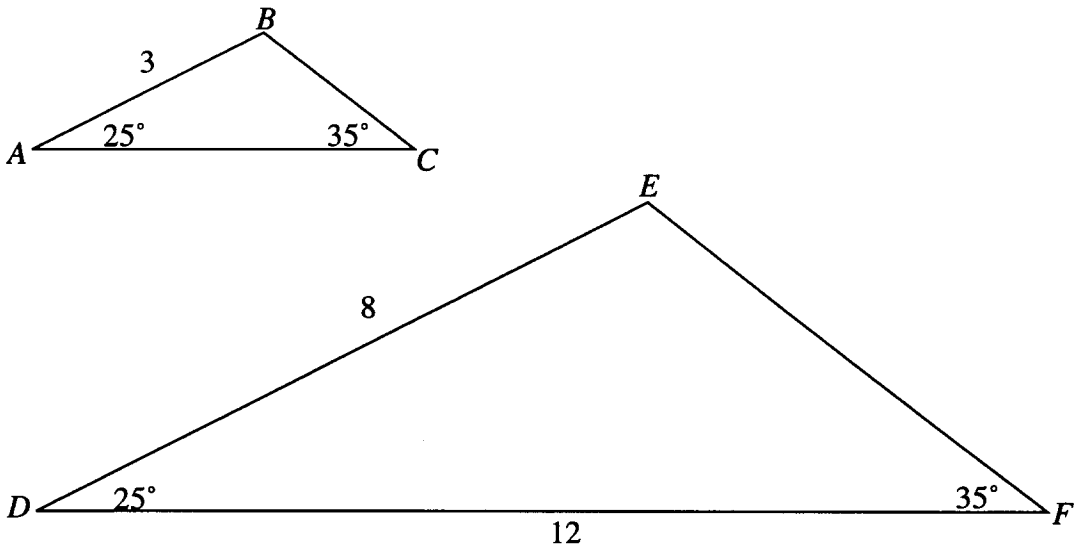
D)



E)



17. 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.

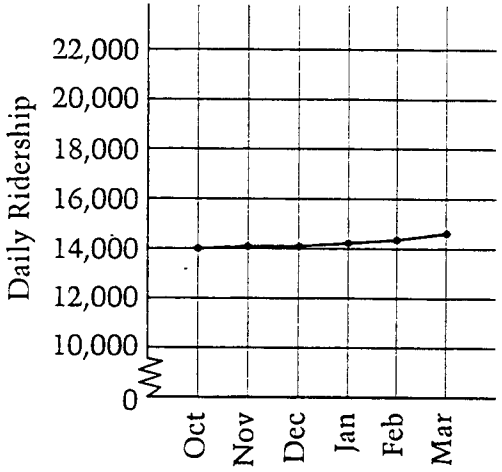
18.

METRO RAIL COMPANY

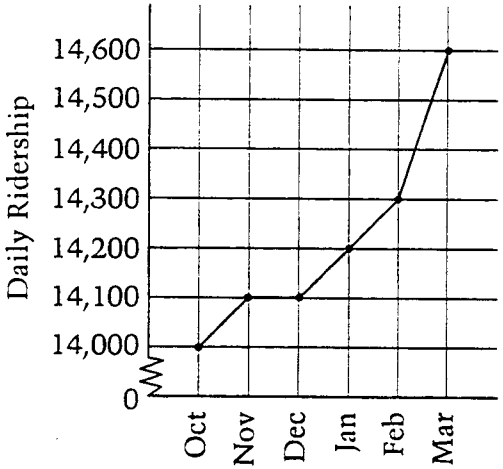
Month	Daily Ridership
October	14,000
November	14,100
December	14,100
January	14,200
February	14,300
March	14,600

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

Graph A



Graph B



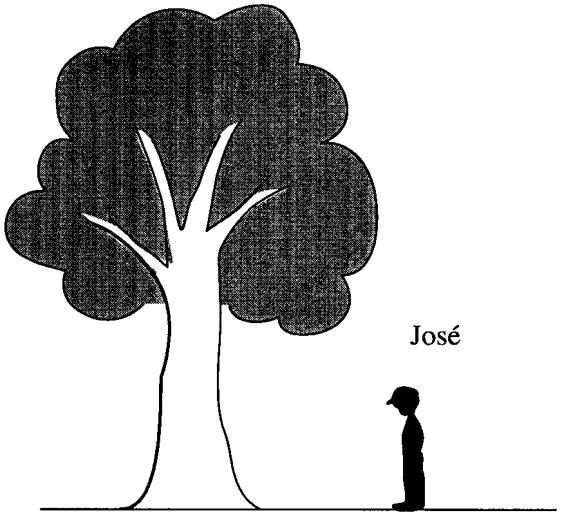
Which graph would be best to help convince others that the Metro Rail Company made a lot more money from ticket sales in March than in October?

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?

GBT1L8

A) 4 m

B) 6 m

C) 8 m

D) 10 m

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

ABT1O7

A) 2

B) 5

C) 10

D) 95

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.

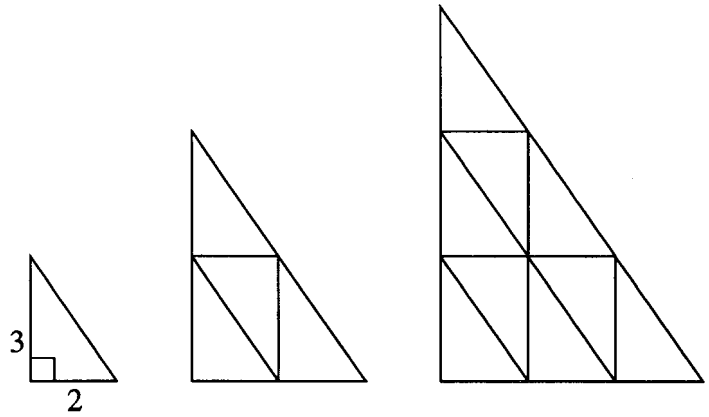


Figure 1 Figure 2 Figure 3

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?

ABT1I8

A) (1, 1)

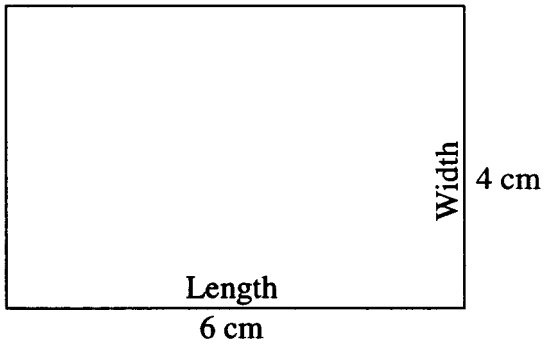
B) (2, 4)

C) (5, 6)

D) (6, 3)

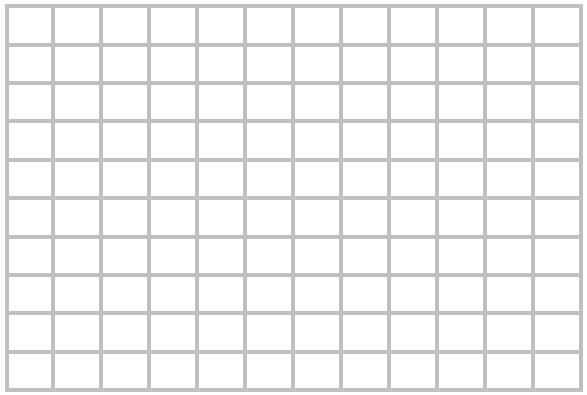
E) (6, 5)

24.



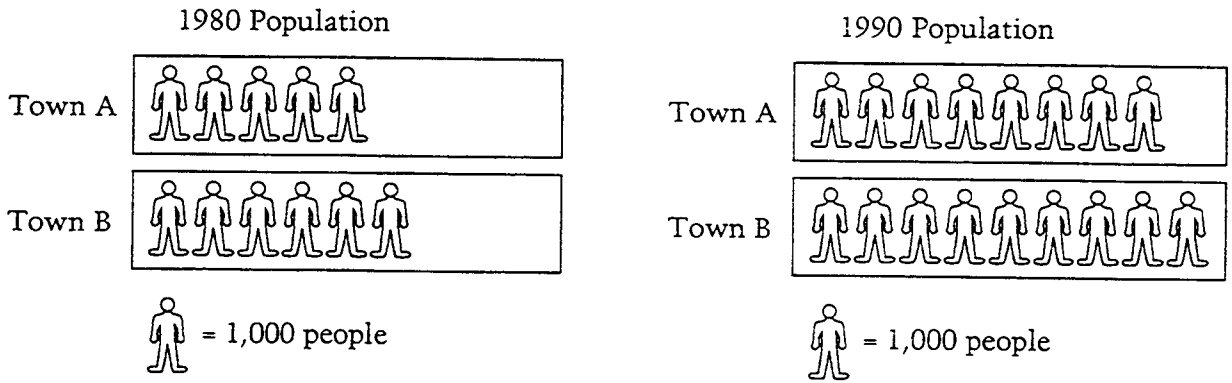
a. In the space below, draw a new rectangle whose length is one and one half times the length of the rectangle above, and whose width is half the width of the rectangle above. Show the length and width of the new rectangle in centimeters on the figure.

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 ?

ACT1I1

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																			
												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	Performance category	Gr 8 p-val	Comments
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 contet; select correct answer.
4	1704001	AAN1K1	k+6	1	E		MC	A		X		1		2					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																			
												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	Performance category	Gr 8 p-val	Comments
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																		
												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	Performance category	Gr 8 p-val	Comments
14	1714001	SCN1M3	Sit-ups scatterplot	1	D		MC	S		X				1					2								1	23	Interpet 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		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		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																			
												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	Performance category	Gr 8 p-val	Comments
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 montly 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																		
												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	Performance category	Gr 8 p-val	Comments
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)

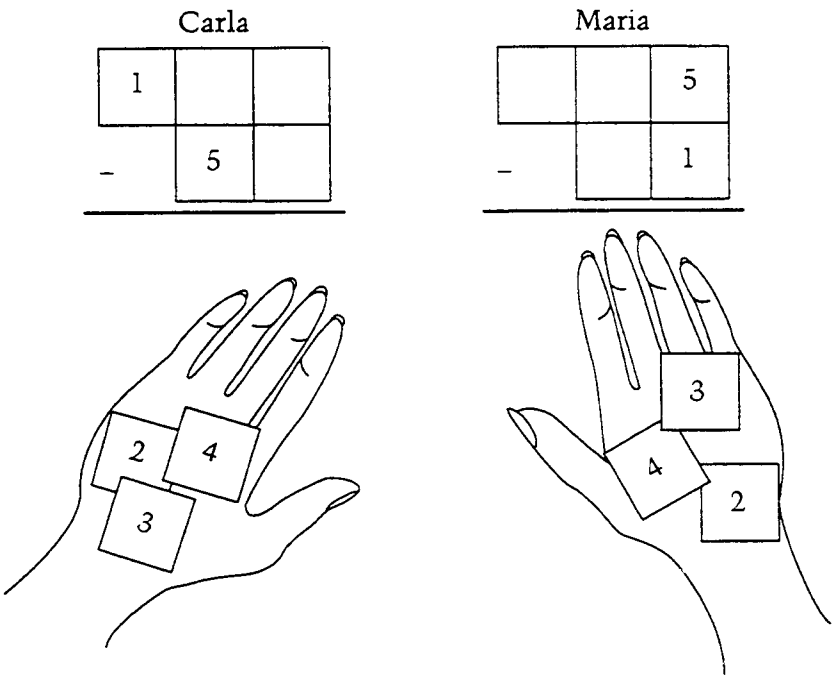
Table N-6
EA item details, Grade 7

Item				Response Format					Degree of Formalization			Competency Classes																			
												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	Performance category	Gr 8 p-val	Comments
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; sekect 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.



Who will win the game?_____

NCP1C13

Explain how you know this person will win.

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

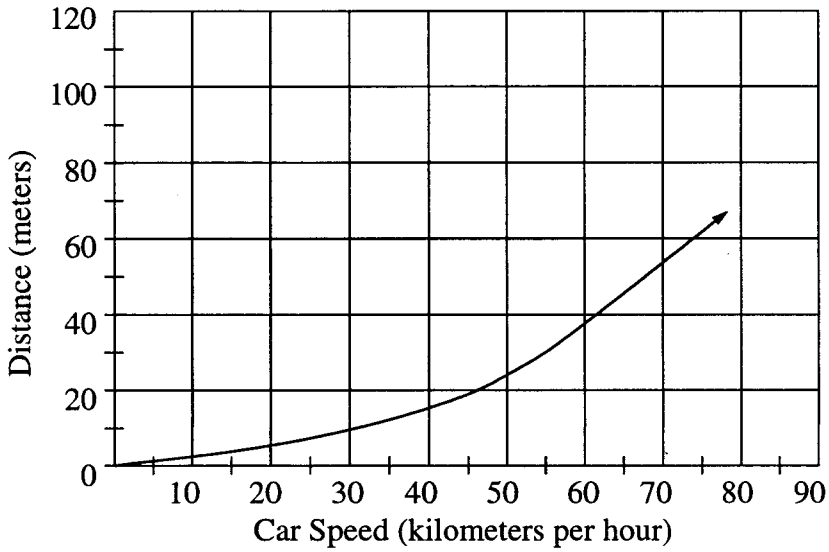
4. Jill needs to earn $45.00 for a class trip. She earns $2.00 each day on Mondays, Tuesdays, and Wednesdays, and $3.00 each day on Thursdays, Fridays, and Saturdays. She does not work on Sundays. How many weeks will it take her to earns $45.00 ?

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.

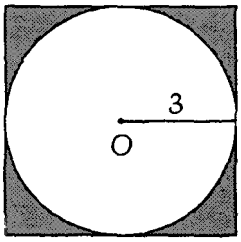
SBT1R8



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?

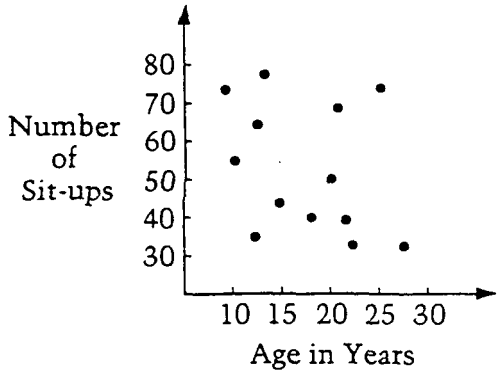
NBT1I2

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

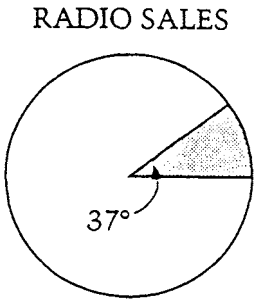


10. In the graph above, each dot shows the number of sit-ups and the corresponding age for one of the 13 people. According to this graph, what is the median number of sit-ups for these 13 people?

SCN1M3

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

11.



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?

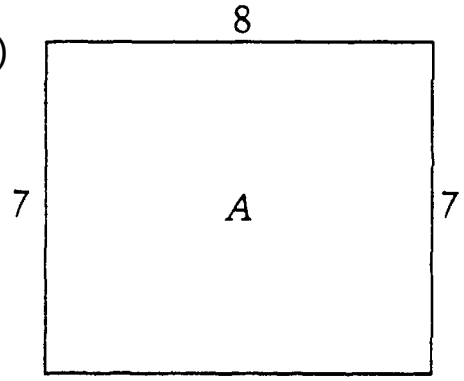
NBN1K4

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

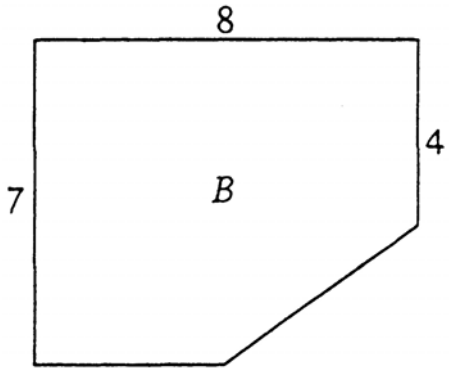
12. For each figure below, the lengths of 3 sides are given. Which figure could have a perimeter of 28?

GBN1O14

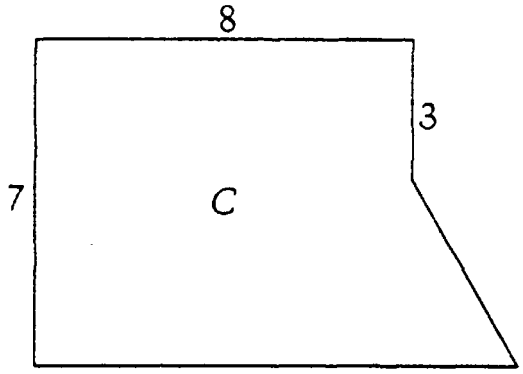
A)



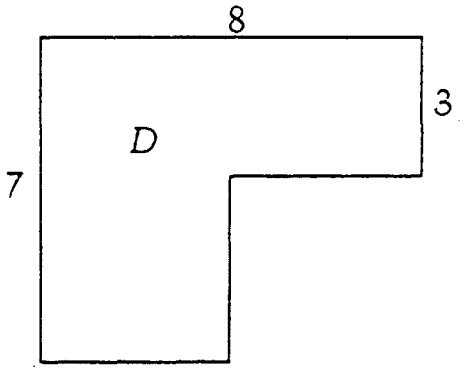
B)



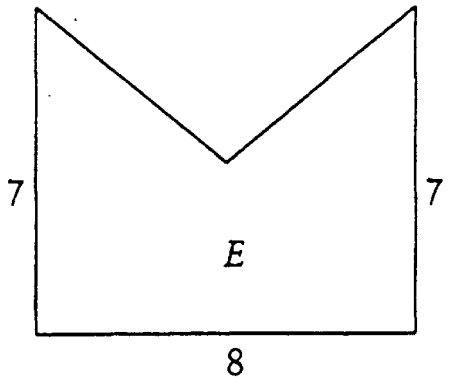
C)



D)



E)



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

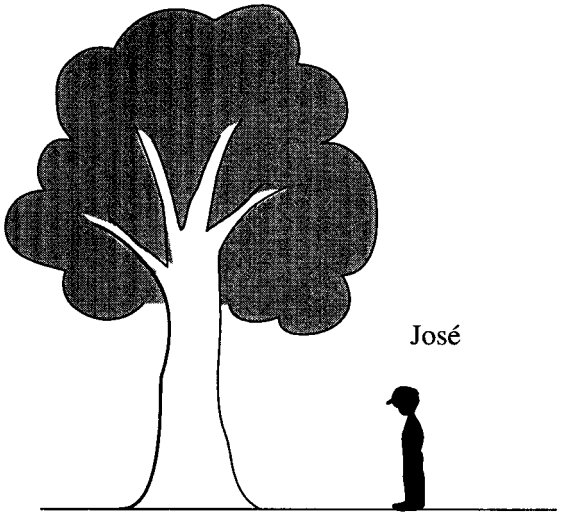
B) 6

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

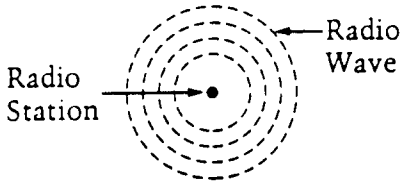
D) 10 m

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 <u>all</u> 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 direction. Radio waves travel from each radio station through the air, as represented below.

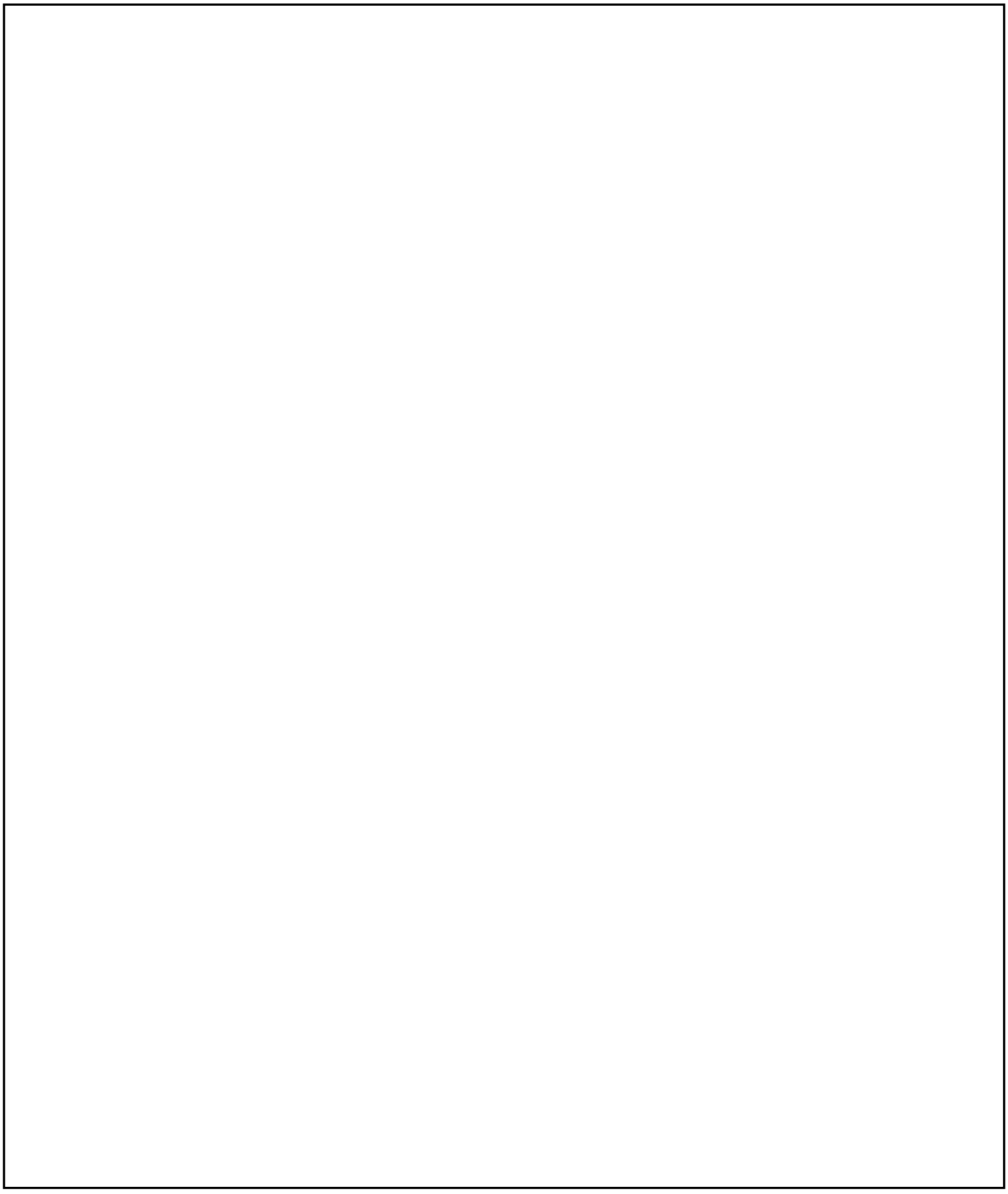


On the next page, draw a diagram that shows the following.

- 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.

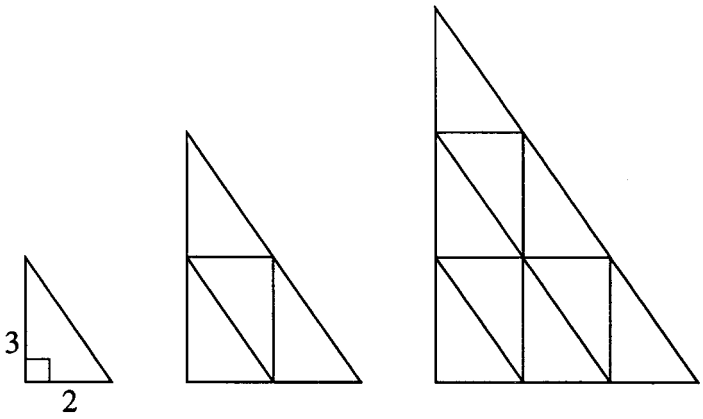


Figure 1 Figure 2 Figure 3

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?

ABT1I8

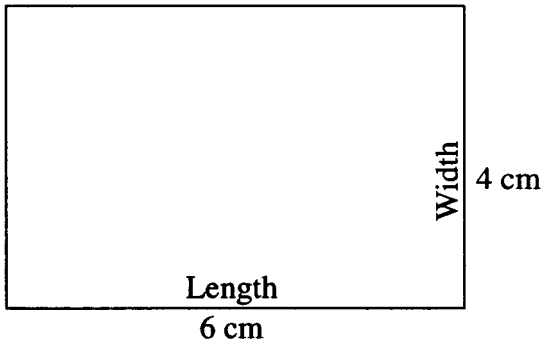
A) (1, 1)
B) (2, 4)
C) (5, 6)
D) (6, 3)
E) (6, 5)

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

NCN1M4

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

22.

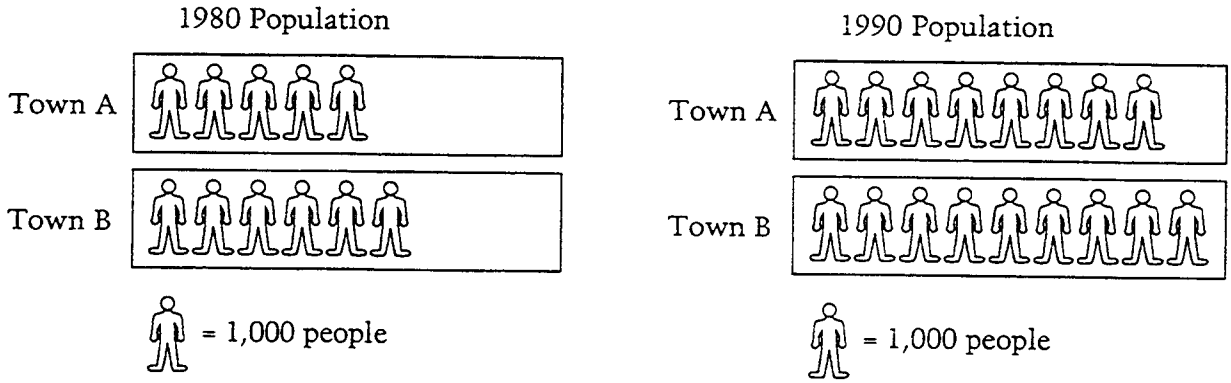


a. In the space below, draw a new rectangle whose length is one and one half times the length of the rectangle above, and whose width is half the width of the rectangle above. Show the length and width of the new rectangle in centimeters on the figure.

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.

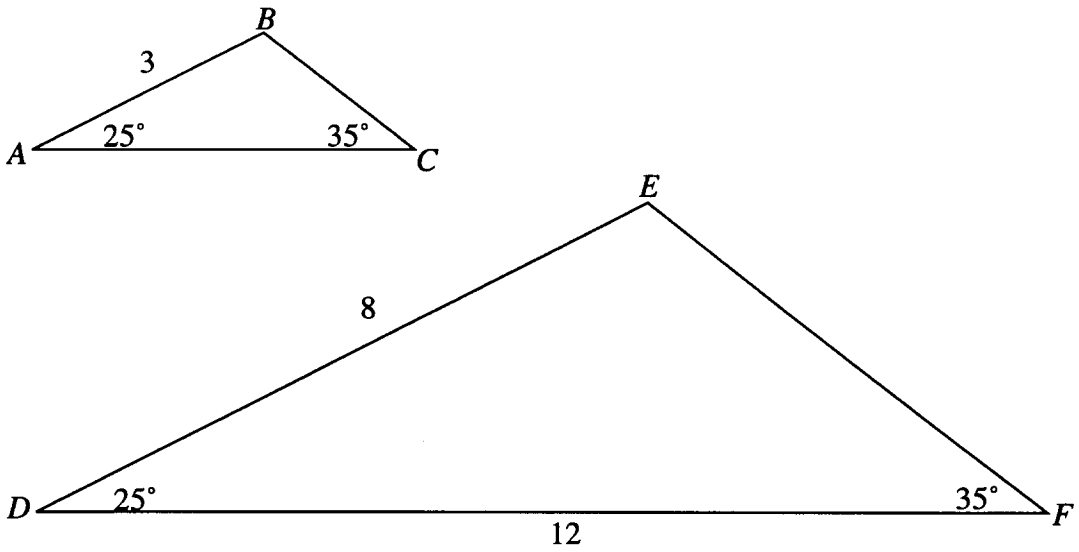
Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.

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 ?

ACT1I1

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

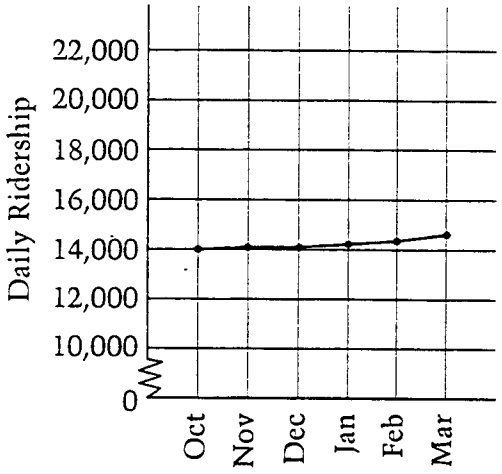
This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

26. METRO RAIL COMPANY

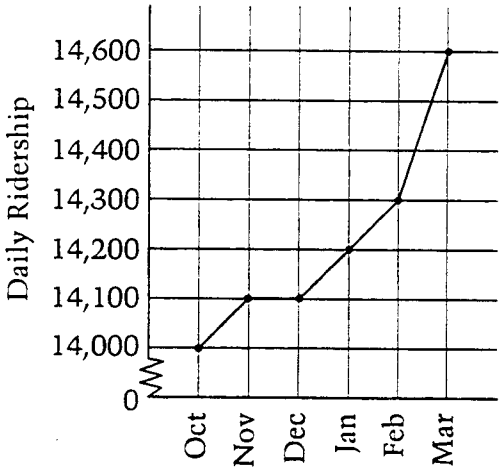
Month	Daily Ridership
October	14,000
November	14,100
December	14,100
January	14,200
February	14,300
March	14,600

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?

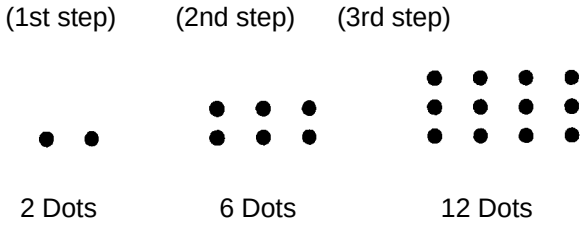
SBP1L9

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 <u>all</u> 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 <u>and</u> 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																				
												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	Performance category	Gr 8 p-val	Comments
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		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		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		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			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							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							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																		
												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	Performance category	Gr 8 p-val	Comments
5	1805001	SBT1R8	Car Speed/Stopping Dist.	1	B		MC	S	X							2			1								1	49	Interpret a graphical representation (line graph); select correct answer.
6	1806001	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.
7	1807001	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.
8	1808001	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; select correct answer
9	1809001	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.
10	1810001	SCN1M3	Sit-ups scatterplot	1	D		MC	S		X				1					2								1	23	Interpet a graphical representation (scatter plot); determine median value; select correct answer
11	1811001	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.
12	1812001	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.
13	1813001	SBT1K7	Blue Pen	1	C		MC	S	X				2	1					2								1	53	Interpret a ratio in a probability context; select correct answer.

Table P-3
EA item details, Grade 8

Item				Response Format					Degree of Formalization			Competency Classes																		
												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	Performance category	Gr 8 p-val	Comments
14	1814001	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.
15	1815001	GCN1E13	Radio Station	1			CR	G		X								2	1								2	16	Draw and label a diagram given specific conditions; calculate and label distance; provide correct answer
15	1815002	GCN1E13	Radio Station	0.75			CR	G		X								2	1								2		Draw and label a diagram given specific conditions; identify but do not calculate common distance.
15	1815003	GCN1E13	Radio Station	0.5			CR	G		X								2	1								2		Draw and label a diagram given specific conditions; neglect to identify common distance.
15	1815004	GCN1E13	Radio Station	0.25			CR	G		X								2	1								1		Draw and label a diagram given specific conditions; use some of given information; neglect to indicate method of determining common distance.
16b	1816201	AAT1S1b	Similar Triangles	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.
17	1817001	ABT1O7	3(x+5)=30	1	B		MC	A		X		1	2														1	72	Solve an equation; use the distributive property; select correct answer.

Table P-4
EA item details, Grade 8

Item				Response Format					Degree of Formalization			Competency Classes																				
												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	Performance category	Gr 8 p-val	Comments
18	1818001	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.
18	1818002	SCT1V2	Zeds	1		39	CR	S		X			2		2			1	2								2		Calculate and compare costs given two different rates and units; alternative approach.
18	1818003	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.
18	1818004	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.
18	1818005	SCT1V2	Zeds	0.33		10	CR	S		X			2		2			1	2								1		Provide correct answer; calculation or explanation incorrect or inadequate.
18	1818006	SCT1V2	Zeds	0.33		11	CR	S		X			2		2			1	2								1		Provide correct answer; no work shown.
18	1818007	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.
18	1818008	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.
18	1818009	SCT1V2	Zeds	0.33		19	CR	S		X			2		2			1	2								1		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										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																		
												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	Performance category	Gr 8 p-val	Comments
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.

Table P-6
EA item details, Grade 8

Item				Response Format					Degree of Formalization			Competency Classes																		
												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	Performance category	Gr 8 p-val	Comments
23	1823001	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
23	1823002	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.
24	1824001	ACT1I1	What is "n"	1	B		MC	A			X	1		2					2								2	37	Demonstrate understanding of variable; select correct answer.
25	1825001	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.
26	1826001	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
26	1826002	SBP1L9	Metro Rail	0.66			CR	S			X								1					2			2		Critically analyze two graphical representations of data; draw correct conclusion; provide incomplete justification
26	1826003	SBP1L9	Metro Rail	0.33			CR	S			X								1					2			2		Critically analyze two graphical representations of data; draw correct conclusion; provide incorrect or no justification
27	1827001	ACN1K9	Dots	1			CR	A		X								1	2							2	2	11	Interpret a pattern demonstrated in diagrams; extend the pattern to the 20th term; generalize the pattern; provide correct answer and explanation.
27	1827002	ACN1K9	Dots	0.75			CR	A		X								1	2							2	2		Interpret a pattern demonstrated in diagrams; extend the pattern to the 20th term; generalize the pattern; provide correct explanation but no answer.
27	1827003	ACN1K9	Dots	0.5			CR	A		X								1	2							2	2		Interpret a pattern demonstrated in diagrams; extend the pattern to the 20th term; generalize the pattern; provide incomplete but correct explanation.
27	1827004	ACN1K9	Dots	0.25			CR	A		X								1	2							2	1		Interpret a pattern demonstrated in diagrams; extend the pattern to the 20th term; attempt to generalize the pattern or draw the series of 20 diagrams.