Alabama Reading and Mathematics Test

Item Specifications

for

Mathematics

Grade 6

Dr. Joseph B. Morton
State Superintendent of Education
Alabama State Department of Education
Montgomery, Alabama
Bulletin 2005, No. 88

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INTRODUCTION

This bulletin provides specific information about the *Alabama Reading and Mathematics Test* (ARMT). Educators representing each State Board of Education district as well as both city and county school systems served on committees to determine the content standards on which the ARMT is based. In addition, educators from throughout the state of Alabama served on committees to review the content of the tests, including selecting and reviewing specific mathematics test items, and determining achievement levels.

Teachers must be familiar with the information in this bulletin so that they may incorporate effective teaching of the mathematics content standards with classroom assessments. Using classroom assessments with similar test formats from time to time will help to enable students to demonstrate proficiency on the various content standards in mathematics.

Three item types are included on the ARMT. Multiple-choice, gridded, and open-ended items assess student performance on the ARMT in mathematics. Multiple-choice items and gridded items carry a point value of one, while open-ended items carry a point value of three. In this document, teachers will see representative item types for each mathematics content standard.

Content Standard	A statement of what students should know and be able to do by the end of the academic year
Item Type	Multiple-choice, gridded, open-ended items
Additional Information	Further information about the test items for the content standard
Sample Items	A collection of item types for each content standard
Answer Key	Answers for multiple-choice and gridded items
Scoring Rubrics for Open-Ended Items	Scoring guide for open-ended items

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CONTENT STANDARDS
Grade 6

CONTENT STANDARD	POINTS POSSIBLE
Number and Operations	
1- Demonstrate computational fluency with addition, subtraction, multiplication, and division of decimals and fractions.	9
2- Solve problems involving decimals, percents, fractions, and proportions.	12
	21
Algebra	
3- Solve problems using numeric and geometric patterns.	5
	5
Geometry	
4- Identify two-dimensional and three-dimensional figures based on attributes, properties, and component parts.	5
5- Plot coordinates on grids, graphs, and maps.	4
	9
Measurement	
6- Classify angles as acute, obtuse, right, or straight.	4
7- Solve problems involving perimeter and area of parallelograms and rectangles.	6
8- Determine the distance between two points on a scale drawing or map using proportional reasoning.	4
9- Convert units of length, weight, or capacity within the same system (customary or metric).	4
	18
Data Analysis and Probability	
10- Interpret information from bar graphs, line graphs, and circle graphs.	6
11- Find the probability of a simple event.	4
	10
TOTAL POINTS POSSIBLE	**63**

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ITEMS BY CONTENT STANDARD

DIRECTIONS (These are the directions given to students.)

Read the problem and find the answer.

If the problem has a multiple-choice answer, darken the bubble in the correct space in your answer document.

If the problem has an answer grid:
- Write your answer in the boxes at the top of the grid.
- Darken the correct bubble of the number or symbol in the column below.
- If your answer is a repeating decimal, round to the nearer hundredth.

For the problems that ask you to show your work, use the space given in your answer document.
- Be sure to show all your work or explain how you got your answer in the space given.
- If you use your calculator to get your answer, explain the steps you take.

For all problems, be sure to check your answers.

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NUMBER AND OPERATIONS

Content Standard 1

Demonstrate computational fluency with addition, subtraction, multiplication, and division of decimals and fractions.

Item Type

Multiple-choice
Gridded

Additional Information

Mixed numbers may be used.
Common and uncommon denominators may be used.
Fractions may be in simplest form.
No word problems/context problems will be used.
No calculators may be used.
One of the options may be NH, which means "Not Here."

Sample Multiple-Choice Items

1. $73.51 + 16.02 = \square$

57.31	57.49	89.53	90.53
A	**B**	**C***	**D**

2. $4\frac{2}{7} + 2\frac{3}{7} = \square$

6	$6\frac{1}{7}$	$6\frac{5}{7}$	$6\frac{5}{14}$
A	**B**	**C***	**D**

3. $16.83 - 4.7 = \square$

30.17	21.53	12.87	12.13
A	**B**	**C**	**D***

4. $6.4 \times 2.3 = \square$

14.72	8.7	3.2	NH
A*	**B**	**C**	**D**

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5. $12 \times \frac{7}{10} = \square$

A $\frac{120}{7}$ **C** $\frac{1}{2}$

B $\frac{42}{5}$ * **D** $\frac{2}{7}$

6. $3.12 \div 0.6 = \square$

A 3.76 **C** 1.872

B 2.52 **D** 5.2*

7.
$$\begin{array}{r} \frac{7}{9} \\ +\ \frac{7}{18} \\ \hline \end{array}$$

$1\frac{5}{9}$ $1\frac{1}{6}$ $\frac{14}{18}$ $\frac{14}{27}$

A **B*** **C** **D**

8.
$$\begin{array}{r} \frac{7}{8} \\ -\ \frac{1}{3} \\ \hline \end{array}$$

$\frac{13}{24}$ $\frac{6}{11}$ $\frac{8}{11}$ $\frac{3}{4}$

A* **B** **C** **D**

9. $\frac{3}{4} \div \frac{6}{4} = \square$

$\frac{7}{24}$ $\frac{1}{2}$ $\frac{3}{4}$ $\frac{9}{8}$

A **B*** **C** **D**

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Answer Key

Content Standard 1

Sample Multiple-Choice

1. C
2. C
3. D
4. A
5. B
6. D
7. B
8. A
9. B

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NUMBER AND OPERATIONS

Content Standard 2

Solve problems involving decimals, percents, fractions, and proportions.

Item Type

Multiple-choice
Gridded
Open-ended

Additional Information

Multi-step problems with decimals and/or percents may be used.
Determining discount, sale price, or original price may be required.
Determining amount of interest may be required.
Tables and charts may be used.
Pictures may be used.
Word problems may be used.
Fractions in their simplest form may be required.
Estimation may be required.
Determining the total payment for a loan may be required.
Determining ratio or proportion may be required.
Determining rate or time in a work problem may be required.
Determining the percent of change may be required.

Sample Multiple-Choice Items

(continued on next page)

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1. Mr. Miele had enough sugar to make $\frac{3}{4}$ of a batch of cookies. To make a whole batch, he needed $\frac{1}{3}$ cup of sugar.

How much cups of sugar did Mr. Miele have?

$\frac{1}{4}$	$\frac{5}{12}$	$\frac{13}{12}$	$\frac{2}{1}$
A*	**B**	**C**	**D**

2.

Paper Goods Store

Paperware	
Plates	$2.99
Napkins	$3.69
Cups	$2.39

Loraine bought 3 packages of plates and 5 packages of napkins for a party.

If the prices on the sign included tax, how much change should Loraine have received from $30?

$2.58	$6.68	$23.32	$27.42
A*	**B**	**C**	**D**

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3. Which is the closest estimate for 33% of 520?

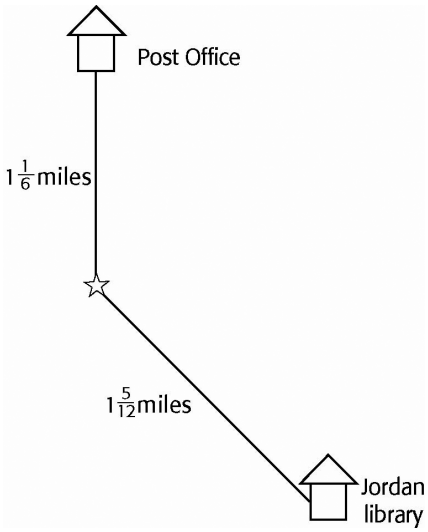
52	170	180	487
A	**B***	**C**	**D**

4. Dana recorded the number of days her brother wore sneakers to school and the number of days he wore loafers to school. The ratio of the number of days he wore sneakers to school to the number of days he wore loafers to school was 5 to 2.

If Dana observed and recorded her brother's choice of shoes for 49 days, how many times did he wear sneakers?

2	5	35	56
A	**B**	**C***	**D**

5. Keely has walked $1\frac{1}{6}$ miles on her way from the Post Office to the Jordan Library. She still has to walk $1\frac{5}{12}$ miles to reach the library.



How many miles in all did Keely have to walk from the Post Office to the Jordan Library?

A $\frac{1}{3}$ miles

B $\frac{1}{6}$ miles

C $2\frac{1}{3}$ miles

D $2\frac{7}{12}$ miles*

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Sample Gridded Items

1. Anna went to the store to buy a new dress. The dress she chose was 30% off the original price.

What was the original price of the dress that was marked down to $13.95?

Mark your answer in the answer grid.

2. There are 650 sixth-grade students in the city. Forty-six percent of the students are boys.

How many of the sixth-grade students in the city are boys?

Mark your answer in the answer grid.

3. A digital camera originally cost $59.95. Its cost decreased 15%.

What is the sales price of the camera, not including tax?

Mark your answer in the answer grid.

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4. The science department has a budget of $400 per year for supplies.

If the science teachers have spent 60% of the supply budget for the year, how much money is left for supplies?

Mark your answer in the answer grid.

5. Mr. Jennings spent 30% of his gardening budget to purchase rose plants.

If he spent *exactly* $60, including tax, on rose plants, how much money should he have left over?

Mark your answer in the answer grid.

6. The price of a shirt was reduced from $32 to $24 during a one-day sale. What is the percent of discount on the price of the shirt during the sale?

Mark your answer in the answer grid.

7. Ashley plans to run a total of 24 miles this week. If Ashley has already run 25% of the total distance, how many more miles does she plan to run this week?

Mark your answer in the answer grid.

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Sample Open-Ended Items

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

1. The manager at Ashley's Dress Shop took 10% off the price of all dresses. One month later, the manager took an additional 15% off the price of the same dresses.

a. What was the price of a $120 dress after the first price reduction?

b. What was the price of a $120 dress after the second price reduction?

c. Would the price be the same if the store manager simply took 25% off the original price of all the dresses?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

2. Lauren and Thomas stuffed envelopes for an election campaign. Lauren stuffed 56 envelopes in 5 minutes and Thomas stuffed 42 envelopes in 3.5 minutes.

a. How many envelopes did Lauren stuff per hour?

b. How many envelopes did Thomas stuff per hour?

c. At the same rate of stuffing envelopes, about how long should it take Lauren and Thomas, working together, to stuff a total of 2604 envelopes?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

3. A food server at Harper's Restaurant is paid $5 per hour plus a 15% tip on the money made on each table he serves.

A food captain at Bea's Fine Dining is paid $8 per hour plus a 12% tip on the money made on each table he serves.

a. If the food server at Harper's Restaurant worked 25 hours and the total amount of money made at his tables was $4,000, what was his total pay for the week?

b. If the food captain at Bea's Fine Dining worked 25 hours and the total amount of money made at his tables was $4,000, what was his total pay for the week?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

4. Ally had a bag of 40 beads. The bag contained 30 red beads and 10 gold beads. After she gave Louise 21 red beads and some gold beads, Ally noticed that the ratio of red to gold beads was the same as it was before she gave any beads to Louise.

a. How many gold beads did Ally give to Louise?

b. How many red beads and gold beads did Ally have left?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

5. Georgie put $500 in her savings account, earning interest at a rate of 4% each year. She did not make any more deposits or withdrawals.

a. How much money was in the account after one year?

b. How much money was in the account after 4 years?

c. Was the amount of money earned in interest the same or different each year?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

6. The Smiths borrowed $1,500 at 6% annual interest to buy a used motorcycle. They paid it back in 12 equal monthly payments.

a. What was the total amount paid back?

b. What was the amount of each payment?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

7. A computer company expects to increase the number of people it employs at a rate of 4% per year for the next four years.

a. If the computer company has 600 employees now, in how many years will it have over 650 employees?

b. If the computer company is able to increase the number of people it employs at a rate of 8% per year, when will it have over 650 employees?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

8. The tally chart below shows the gymnastics scores for 25 gymnasts at a competition.

Gymnastic Scores

Score	Frequency
0 – 5.9	||
6.0 – 6.9	|||
7.0 – 7.9	𝍸 ||||
8.0 – 8.9	𝍸 ||
9.0 – 10.0	||||

a. What percent of the scores were 7.0 *or above*?

b. If the blue ribbon score is a 9.0 or more, what percentage of gymnasts *did not* receive a blue ribbon?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

9. Bernie bought a computer for $900. One year later, the value of the computer was $720.

a. How much did the value of the computer drop?

b. What is the percent of change in the value of the computer?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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Answer Key

Content Standard 2

Sample Multiple-Choice

1. A
2. A
3. B
4. C
5. D

Sample Gridded

1. $46.50
2. 299
3. $50.96
4. $160
5. $140
6. 25%
7. 18

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Sample Open-Ended

1. Sample Response(s):

a. $120 × 0.10 = $12, $120 – $12 = $108.00

OR

I used my calculator to multiply 120 and 10% and this gave me a discount of $12.00. I then subtracted $12 from $120. The price of the dress is $108.00.

OR

I multiplied 120 and 10%. This equaled a discount of $12.00. After that, I subtracted $12 from the original dress price of $120. The price of the dress is now $108.00.

b. $108 × 0.15 = $16.20, $108 – $16.20 = $91.80

OR

I used my calculator to multiply 108 and 15% and this gave me a discount of $16.20. I then subtracted $16.20 from $108. The price of the dress after the second discount is $91.80.

OR

I first multiplied $108 by 15% (0.15). This gave me an answer of $16.20. Then, I subtracted $16.20 from $108. This gave me an answer of $91.80. This is the price of the dress after the second discount.

c. No, the price would not be the same. If the manager took 25% off the original price of the dress, then the dress would be $90.00 instead of $91.80. ($120 × 0.25 = $30, $120 – 30 = $90.)

OR

I used my calculator to find that 25% off the original price would be $90.00 instead of the $91.80 that was found in **part b**. No, the price would not be the same.

Score Point	Response Attributes
3	All is correct.
2	All logics or explanations are correct. OR Two correct logics or explanations and correct answers for two problems or drawings. OR One correct logic or explanation and correct answers for all problems.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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2. Sample Response(s):

a. $\frac{60}{5} = 12$; $56 \times 12 = 672$ envelopes

OR

$\frac{56}{5} = \frac{x}{60}$, $56 \times 60 = 5 \times x$, $3360 = 5x$, $3360 \div 5 = 672$ envelopes

OR

1 hour equals 60 minutes. There are 12 5-minute intervals in 60 minutes. I multiplied 56 times 12 to get 672 envelopes per hour.

b. $60 \div 3.5 \times 42$ = approximately 720 envelopes.

OR

I used my calculator to figure out how many times 3.5 goes into 60 ($60 \div 3.5$). I then took that answer and multiplied it times 42 to get approximately 720 envelopes per hour.

OR

I found out how many times 3.5 goes into 60 by dividing the two numbers ($60 \div 3.5$). Then, I took the answer and multiplied it times 42. Thomas stuffed approximately 720 envelopes per hour.

c. $672 + 720 = 1392$
$2604 \div 1392 = 1.87$
Round up to 2. About 2 hours.

OR

About two hours. Take the answer from **part a** (672) and the answer from **part b** (720) and add these two together (1392). Then, take 2604 and divide it by 1392. This gives an answer of 1.87 which rounds to 2.

OR

I used my calculator to find that it would take about 2 hours to stuff a total of 2604 envelopes. In my calculator I entered 672 + 720 and got 1392. I then did $2604 \div 1392$ and it gave me an answer of 1.87. I rounded this number up to 2.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR Two correct logics or explanations and correct answers for two problems or drawings. OR One correct logic or explanation and correct answers for all problems.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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3. Sample Response(s):

a. Harper's Restaurant: $5 × 25 = $125; 0.15 × $4000 = $600; $125 + $600 = $725

OR

I used my calculator and multiplied 5 times 25 to get $125. Then I multiplied 4000 times 15% (0.15) to get $600. I then added $125 and $600 for a total of $725.00.

OR

First, I multiplied 5 times 25. This gave me $125. After that, I multiplied 4000 times 15% and got an answer of $600. Then, I added the two answers ($125 and $600) and got a total answer of $725.00. The food server made $725.00 for the week.

b. Bea's Fine Dining: $8 × 25 = $200; 0.12 × $4000 = $480; $200 + $480 = $680

OR

I used my calculator and multiplied 8 times 25 to get $200. Then, I multiplied 4000 times 12% (0.12) to get $480. I then added $200 and $480 for a total of $680.00.

OR

First, I multiplied 8 times 25. This gave me $200. After that, I multiplied 4000 times 12% and got an answer of $480. Then, I added the two answers ($200 and $480) and got a total answer of $680.00. The food captain made $680.00 for the week.

Score Point	Response Attributes
3	All is correct.
2	Two logics and explanations are correct. OR One correct logic or explanation and correct answer to both problems.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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4. Sample Response(s):

a. $\frac{30}{10} = \frac{30-21}{x} = \frac{9}{x}$; $30x = 90$, $x = 3$; $10 - 3 = 7$. Ally gave Louise 7 beads.

OR

There are 30 red beads and 10 gold beads. This is a 3 to 1 ratio of red to gold beads. Since Ally had 21 gold beads, she would have to give Louise 7 gold beads to keep the same 3 to 1 ratio.

OR

I set up a proportion and used my calculator to solve the problem. The answer from my proportion was 3. Since there were 10 gold beads, I subtracted 3 and got 7.

b. 30 – 21 = 9 red beads left
10 – 7 = 3 gold beads left

OR

Ally started with 30 red beads, gave 21 away, so she had 9 red beads left.
Ally started with 10 gold beads, gave 7 away, so she had 3 gold beads left.

OR

I used my calculator to subtract 21 from 30 to get 9 red beads left and 7 from 10 to get 3 gold beads left.

Score Point	Response Attributes
3	All is correct.
2	Two logics or explanations are correct. OR One correct logic or explanation and correct answer to two or more problems.
1	Correct answers to one or more problems or drawings. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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5. Sample Response(s):

a. $500 × 0.04 = $20; $500 + $20 = $520

OR

On my calculator, I multiplied 500 times 0.04. Then, I took the answer and added $500 to get a total of $520.

OR

First, I multiplied 500 times 0.04. This gave me an answer of 20. Then, I added 20 to 500 and got an answer of $520. This is how much money that was in the account after one year.

b. To calculate the amount of money Georgie had after 4 years:
after 1 year she had 500 × 0.04 = 20; 500 + 20 = 520
after 2 years she had 520 × 0.04 = 20.80; 520 + 20.80 = 540.80
after 3 years she had 540.80 × 0.04 = 21.63; 540.80 + 21.63 = 562.43
after 4 years she had 562.43 × 0.04 = 22.50; 562.43 + 22.50 = 584.93

OR

First, I took the answer for the amount of money that was in the account after one year ($520) and multiplied it times 0.04. Then, I added $520 to that answer and got an answer of $540.80. $540.80 is the amount in the account after 2 years. To find out how much money was in the account after 3 years, I took $540.80 and multiplied it times 0.04 to get $21.63. I added $540.80 and $21.68 to get an answer of $562.43. To find out how much was in the account after 4 years, I took the year 3 answer of $562.43 and multiplied it by 0.04 for an answer of $22.50. Add $562.43 and $22.50 for a final answer of $584.93.

OR

I used a calculator to find the amount in the account after 4 years. I first took the answer from **part a** and kept multiplying the answer I got by 1.04, 3 times, until I got an answer of $584.93.

c. The amount of money earned in interest each year was different. For year one it was $20; for year two it was $20.80; for year three it was $22.43, and for year four it was $22.50.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR Two correct logics or explanations and correct answer for two problems OR One correct logic or explanation and correct answers for all problems.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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6. Sample Response(s):

a. $1500 × 0.06 = $90; $1500 + $90 = $1590

OR

On my calculator, I multiplied 1500 times 0.06 and got an answer of 90. After that, I added 1500 to 90 and got a final answer of $1590.

OR

To calculate the annual interest for one year, I multiplied 1500 times 0.06 to get 90. Then I added 90 to 1500 and got an answer of $1590.

b. $1590 ÷ 12 = $132.50

OR

On my calculator, I divided $1590 by 12 to get $132.50

OR

To calculate the amount paid each of 12 months, I divided $1590 by 12. The amount of money paid back each month for 12 months was $132.50.

Score Point	Response Attributes
3	All is correct.
2	Two logics or explanations are correct. OR One correct logic of explanation and correct answer to both problems.
1	Error in logic or explanation and correct answers to two problems or drawings. OR Correct answers to one or two problems or drawings. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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7. Sample Response(s):

a. Year 1: 600 × 0.04 = 24; 600 + 24 = 624
Year 2: 624 × 0.04 = 24.96; 624 + 24.96 = 648.96
Year 3: 648.96 × 0.04 = 25.96; 648.96 + 25.96 = 674.92.
It will take 3 years to have over 650 employees.

OR

I have to find the amount of employees after each year and then find 4% of that number before calculating the next year. Take 600 and multiply it by 0.04 to get 24. Add 24 to 600. Take 624 and multiply it by 0.04 to get 24.96 and add that to 624. Take 648.96 and multiply it times 0.04 to get 25.96. Once you add 648.96 and 25.96 that is over 650, so three years is the amount of time it will take for this company to have over 650 employees.

OR

I used my calculator to find that it will take three years to have over 650 employees. Take 600 and multiply that by 0.04 and add that answer to 600. Continue to take your answer and multiply it by 0.04 until you get at least 650.

b. Year 1: 600 × 0.08 = 48; 600 + 48 = 648
Year 2: 648 × 0.08 = 51.84; 648 + 51.84 = 699.84
It will take 2 years to have over 650 employees.

OR

To calculate the amount of time before there are 650 employees, I have to find the amount of employees after one year and then find 8% of that number before calculating the next year. For the first year, take 600 and multiply it by 0.08 for an answer of 48. Add 48 to 600, and take that answer and multiply it again by 0.08 for an answer of 51.84. Add 51.84 to 648 for a total of 699.84. It will take two years to have over 650 people.

OR

I used my calculator to find that it will take two years to have over 650 employees. Take 600 and multiply that by 0.08. Then, add that answer to 600. Continue to take your answer and multiply it by 0.08 until you get at least 650.

Score Point	Response Attributes
3	All is correct.
2	Two logics or explanations are correct. OR One correct logic or explanation and correct answer to both problems.
1	Error in logic or explanation and correct answers to two problems or drawings. OR Correct answers to one or two problems or drawings. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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8. Sample Response(s):

a. $\frac{20}{25} = 0.80 = 80\%$

OR

To calculate the percent of scores that were 7.0 or higher, I counted 20 scores, and divided by the total number of scores.

So, $\frac{20}{25} = 0.80$ which is 80%.

OR

I used my calculator to divide 20 by 25 for an answer of 0.8 which is 80%.

b. $\frac{21}{25} = 0.84 = 84\%$ that did not receive a blue ribbon.

OR

To calculate the percentage of gymnasts that did not receive a blue ribbon, count the number of scores in the 9.0 – 10.0 range, which is 4 scores. Subtract that from the total number of scores which is 25 scores (25 – 4 = 21). Take 21 and divide by the total number of scores. So, $\frac{21}{25} = 0.84$ which is 84%.

OR

I used my calculator to divide 21 by 25 for an answer of 0.84 or 84%.

Score Point	Response Attributes
3	All is correct.
2	Two logics or explanations are correct. OR One correct logic or explanation and correct answer to one or more problems.
1	Error in logic or explanation and correct answers to two problems or drawings. OR Correct answers to one or two problems or drawings. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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9. Sample Response(s):

a. $900 – $720 = $180

OR

On my calculator, I subtracted 720 from 900 to get 180.

OR

To find the amount of decrease from $900 to $720, subtract, $900 – $720 = $180.

b. $\frac{180}{900}$ = 0.20 or 20%.

OR

On my calculator, I first divided the amount of change (180) by the original amount (900). After that, I converted the answer (0.20) into a percent to get 20%.

OR

To find the percent of change, divide the amount of change by the original amount, then convert to a percent. So, $\frac{180}{900}$ = 0.20 or 20%.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR One correct logic or explanation and correct answers for all problems.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None is correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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ALGEBRA

Content Standard 3

Solve problems using numeric and geometric patterns.

Item Type

Multiple-choice
Gridded

Additional Information

Determining a rule may be required.
Tables and charts may be used.
Work problems and problems in context may be used.

Sample Multiple-Choice Items

1. The table below shows the amount of money Susan collected for a charity each week.

Susan's Collections

Week	Amount Collected
1	$5
2	$12
3	$19
4	$26

If the pattern shown in the table continued to increase by the same amount each week, how much should Susan have collected for charity in the ninth week?

$33	$40	$47	$61
A	**B**	**C**	**D***

2. Serena used 144 as the first term in a pattern. To get terms after the first, she used the rule "divide by 2, divide by 3, divide by 4, etc."

144, 72, 24, 6, ___?___

If Serena continued her pattern according to the same rule, which term should she have written next?

30	5	1.5	1.2
A	**B**	**C**	**D***

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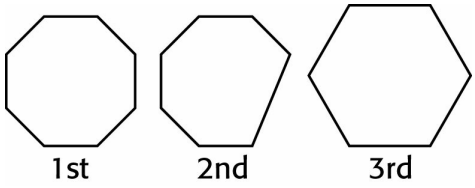
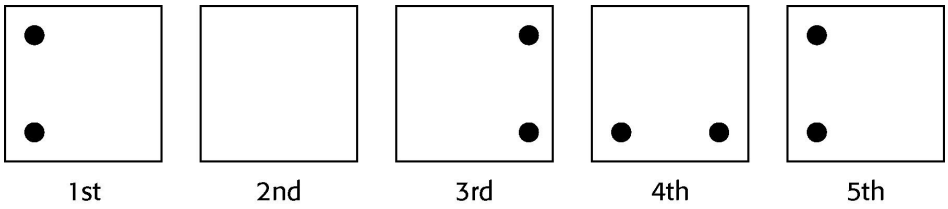
3. Travis started the pattern shown below.



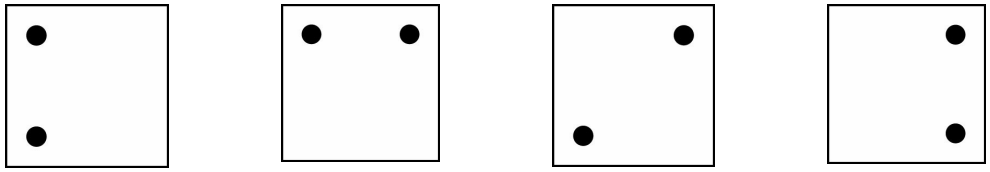
If the pattern of taking away one side continues as shown, how many sides should the 5th figure have?

14	6	4	1
A	**B**	**C***	**D**

4. Elizabeth started the pattern shown below.



Which of the following should Elizabeth have drawn as the second figure?



A **B*** **C** **D**

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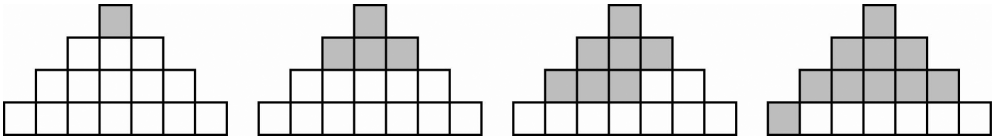
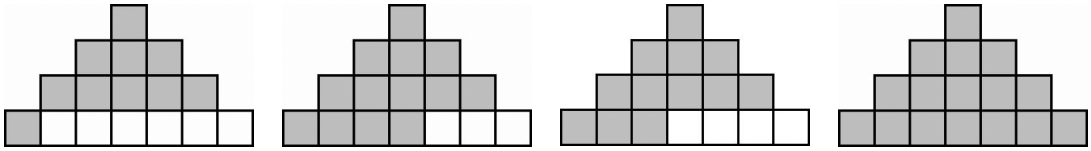
5. Arthur started this add 3 pattern.

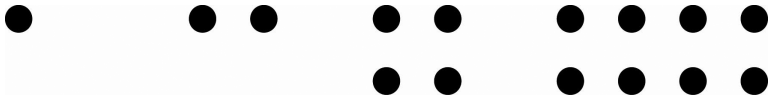


If the pattern continues as shown, which of these should Arthur have drawn as the next figure?



A **B*** **C** **D**

6. Victor started this doubling pattern.



If the pattern continues as shown, how many dots should Victor draw in the next figure?

10	12	16	24
A	**B**	**C***	**D**

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7. The table below shows the number of cars Mario bought and the total amount spent. Each toy car has the same value.

Mario's Toy Cars

Number of Cars	Total Cost in Dollars
5	$4.50
10	$9.00
15	$13.50

If the pattern continued as shown in the table, what would be the total cost of 21 of these toy cars?

$0.90	$18.00	$18.90	$22.50
A	**B**	**C***	**D**

8. Jordan started the number pattern below.

0.489, 0.448, 0.407, 0.366, __

If the pattern continues as shown, which of the following rules should he use to find the next term in the number pattern?

A Subtract 0.041*
B Add 0.041
C Add 0.41
D Subtract 0.41

9. A pattern with differences is shown below.

Original Pattern 20 , 30 , 50 , 80 , 120 , __

Differences 10 20 30 40

What should be the next term in the original pattern if the difference continues to increase at a constant rate?

160	170	180	190
A	**B***	**C**	**D**

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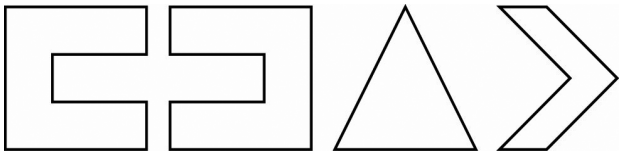
Sample Gridded Items

1. A local radio station plans to give away 2 concert tickets on Monday, 6 concert tickets on Tuesday, and 18 concert tickets on Wednesday.

If this pattern continues, how many concert tickets will the radio station give away on Friday?

Mark your answer in the answer grid.

2. A pattern of 31 shapes appears on the border of an office building. The first 4 shapes of the pattern are shown below.



If the 4 shapes above keep repeating in this order, how many triangles are in the pattern?

Mark your answer in the answer grid.

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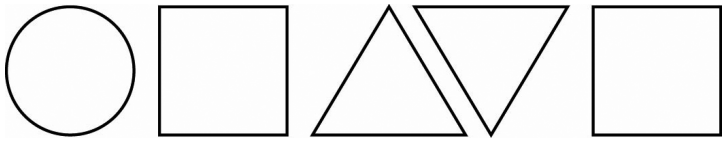
3. Ashley's school collected pennies for 8 days to fund a college scholarship. On the first day, Ashley brought 1 penny, the second day she brought 2 pennies, the third day she brought 4 pennies, and the fourth day she brought 8 pennies.

If the pattern continued with the number of pennies doubling on each consecutive day, how many pennies did Ashley bring in all after 8 days?

Mark your answer in the answer grid.

4. Jesse decorated an award plaque by drawing a pattern of geometric figures. The first 5 shapes of his pattern are shown below.



If Jesse repeats the pattern in the order shown until there are 13 squares and 14 triangles, how many figures did he draw in his entire pattern?

Mark your answer in the answer grid.

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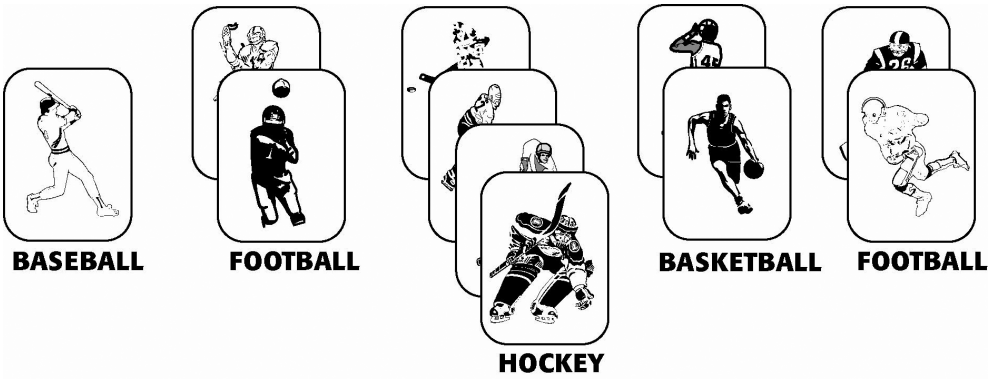
5. Jared arranged his 44 sports cards in a pattern. Each sports card had a picture of a baseball player, football player, hockey player, or basketball player. The first 11 sports cards in the pattern are shown below.



If the 11 sports cards above kept repeating in this order, how many of Jared's sports cards had a picture of a hockey player?

Mark your answer in the answer grid.

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Answer Key

Content Standard 3

Sample Multiple-Choice

1. D
2. D
3. C
4. B
5. B
6. C
7. C
8. A
9. B

Sample Gridded

1. 162
2. 8
3. 255
4. 34
5. 16

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GEOMETRY

Content Standard 4

Identify two-dimensional and three-dimensional figures based on attributes, properties, and component parts.

Item Type

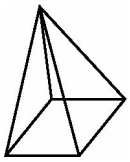
Multiple-choice

Additional Information

Matching a net to a three-dimensional figure may be required.
Diagrams of two-dimensional figures or three-dimensional figures may be used.
Word problems/real-life situations may be used.

Sample Multiple-Choice Items

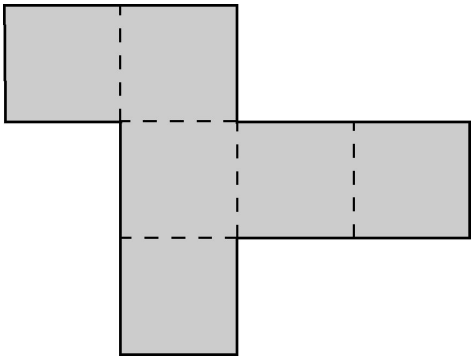
1. Gretta drew the figure below.



Which of these names the figure Gretta drew?

A Rectangular prism
B Triangular prism
C Triangular pyramid
D Square pyramid*

2. A net of a three-dimensional figure is shown below. A net is a pattern to be cut and folded to make a solid shape.



Which of these figures could be formed if the net was folded along the dotted line segments?

A Cube *
B Triangular pyramid
C Rectangular pyramid
D Triangular prism

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3. Which regular figure has only 6 congruent angles?

A Triangle
B Pentagon
C Hexagon*
D Octagon

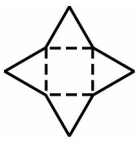
4. Which figure *always* has 4 congruent sides and *exactly* 2 sets of parallel sides?

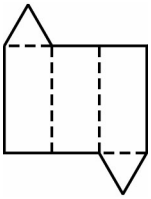
A Trapezoid
B Rectangle
C Rhombus*
D Parallelogram

5.

Which figure shows this solid unfolded on a flat surface?

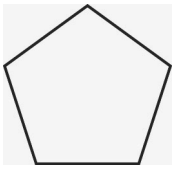
A

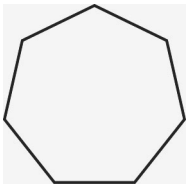
C


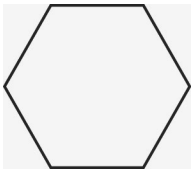
B*


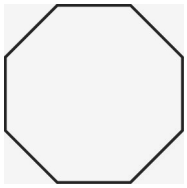
D

6. Which of the following figures is an octagon?

A


C


B


D*


7. Lyle designed a garden so that it had seven equal sides.

Which figure has *exactly* 7 sides of equal length?

A A regular pentagon
B A regular heptagon*
C A regular nonagon
D A regular decagon

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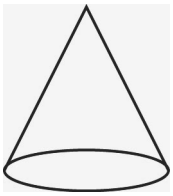
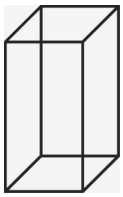
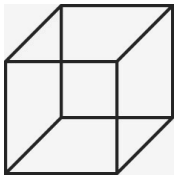
8. Which of the following figures *always* has 4 congruent sides?

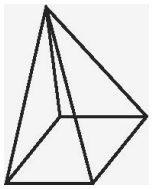
A Isosceles trapezoid
B Parallelogram
C Rectangle
D Rhombus*

9. Which of these *appears* to be a square pyramid?

A 

C 

B 

D* 

10. Which of the following two-dimensional figures has *exactly* 5 sides?

A Parallelogram
B Pentagon*
C Hexagon
D Octagon

11. Henry cut a piece of cardboard into different-shaped pieces. One of the pieces had *exactly* 2 sets of parallel sides and 4 congruent angles.

Which could be one of the pieces Henry cut?

A A trapezoid
B A rhombus
C A square*
D A pentagon

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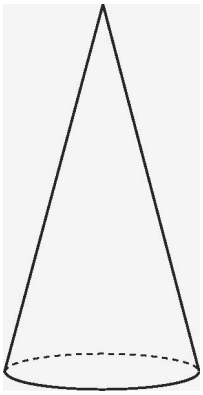
12. Alyssa drew the picture of the three-dimensional figure below.



Which of the following names the figure Alyssa drew?

A Cone*
B Cylinder
C Pyramid
D Sphere

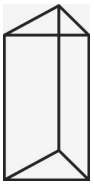
13. Gabriella drew a picture of a swimming pool. The swimming pool had five sides.

Which is the shape of the swimming pool she drew?

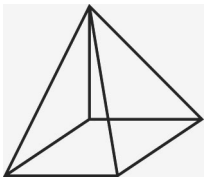
A Pentagon*
B Parallelogram
C Trapezoid
D Hexagon

14. Which of these *appears* to be a triangular pyramid?

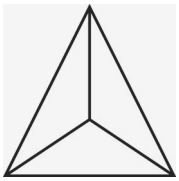
A



C



B*



D

15. Albert drew several three-dimensional figures.

Which of the following figures had *exactly* 5 faces and 5 vertices?

A Triangular pyramid
B Triangular prism
C Rectangular pyramid*
D Rectangular prism

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Answer Key

Content Standard 4

Sample Multiple-Choice

1. **D**
2. **A**
3. **C**
4. **C**
5. **B**
6. **D**
7. **B**
8. **D**
9. **D**
10. **B**
11. **C**
12. **A**
13. **A**
14. **B**
15. **C**

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GEOMETRY

Content Standard 5

Plot coordinates on grids, graphs, and maps.

Item Type

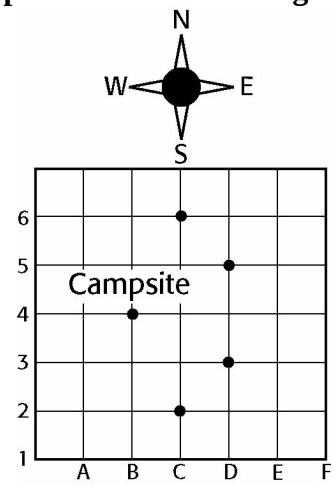
Multiple-choice

Additional Information

Identifying coordinates of a point on a grid, graph, or map may be required.
Following directions to locate a point on a grid, graph, or map may be used.
Using ordered pairs to represent the location of a point on a grid, graph, or map may be used.
Identifying coordinates of a point on the coordinate plane may be required.
Real-life situations may be included.

Sample Multiple-Choice Items

1. The location of the campsite is shown on the grid.



The swimming pool is located two blocks east and one block south of the campsite.
What is the location of the pool?

C-2	C-6	D-3	D-5
A	**B**	**C***	**D**

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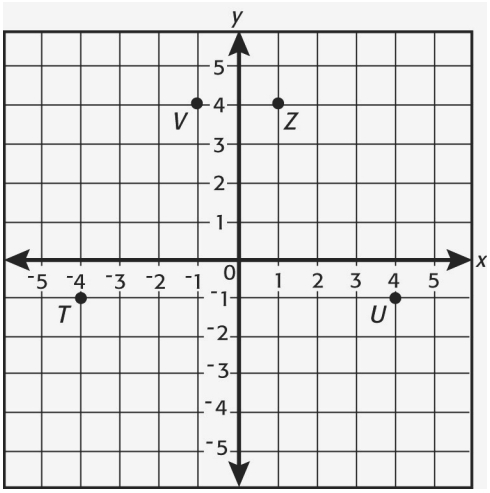
2. Beverly graphed 4 points on the grid below.



Which of the following points *best* represents the coordinates (-1, 4)?

T	*U*	*V*	*Z*
A	**B**	**C***	**D**

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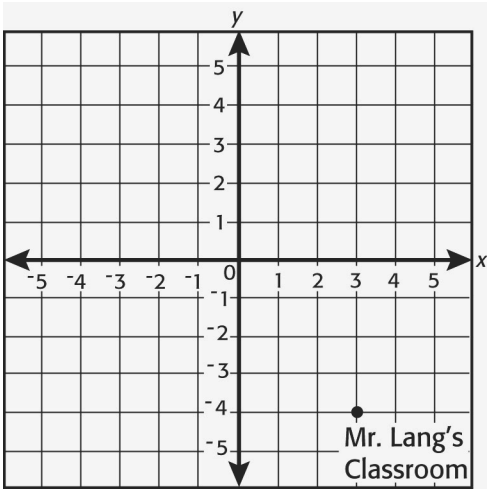
3. The grid below shows the location of Mr. Lang's classroom.



Which *best* represents the coordinates of Mr. Lang's classroom?

(3, 4)	(3, ⁻4)	(⁻4, 3)	(4, 3)
A	**B***	**C**	**D**

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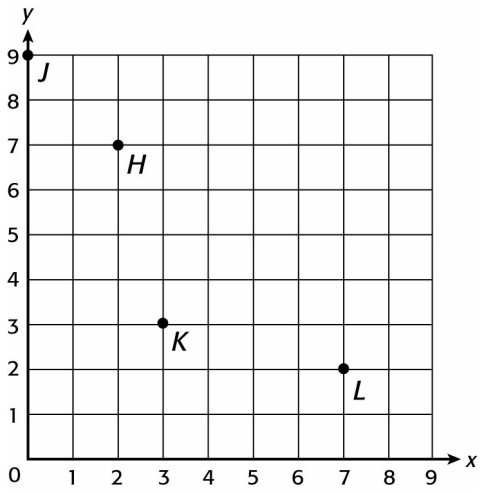
4.



Which point on the grid is *best* represented by the ordered pair (7, 2)?

H	*J*	*K*	*L*
A	**B**	**C**	**D***

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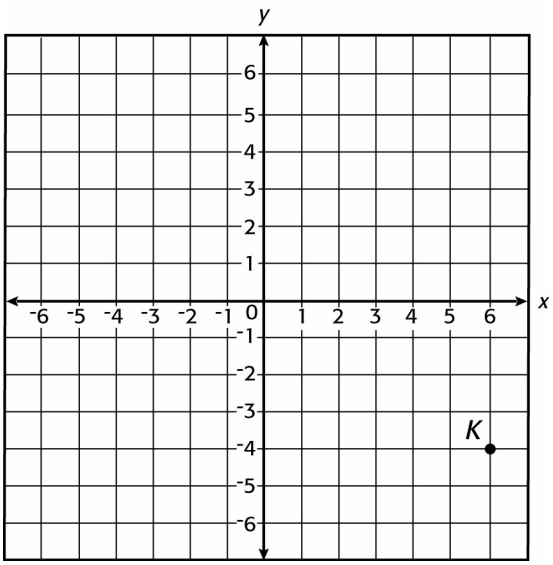
5. Kendra graphed point *K* on the grid below.



Which ordered pair *best* represents the location of point *K*?

(6, ⁻4)	(⁻4, 6)	(6, 4)	(⁻4, ⁻6)
A*	**B**	**C**	**D**

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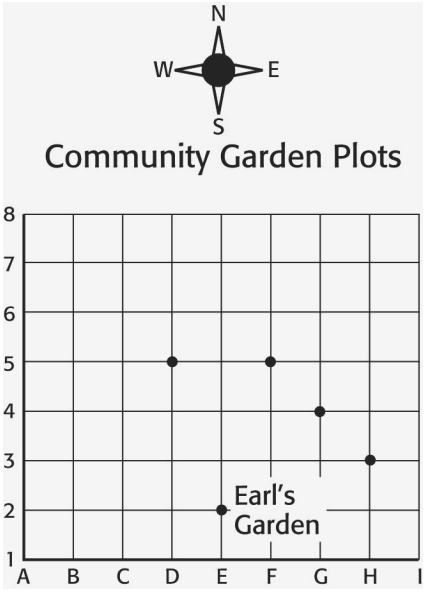
6. The location of Earl's garden in the community garden is shown on the grid below.



Diane's garden plot is located 3 units north and 1 unit west of Earl's garden plot. Which point *best* represents the location of Diane's garden?

D-5	F-5	G-4	H-3
A*	**B**	**C**	**D**

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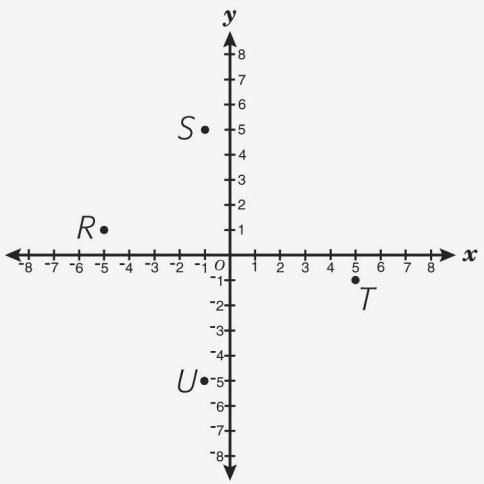
7. The letters on the grid below represent the different places Doug needs to go to help him locate items in a scavenger hunt.



Which of the following letters is located at (5, ⁻1) on the grid?

U	*R*	*S*	*T*
A	**B**	**C**	**D***

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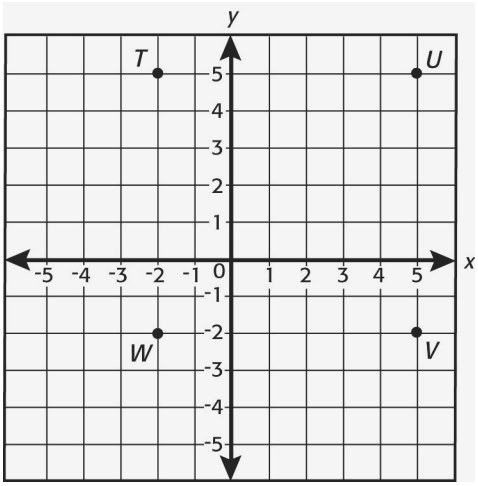
8. The grid below shows the location of 4 vertices of a square.



Which vertex of the square is located at point (5, ⁻2) on the grid?

T	*U*	*V*	*W*
A	**B**	**C***	**D**

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Answer Key

Content Standard 5

Sample Multiple-Choice

1. C
2. C
3. B
4. D
5. A
6. A
7. D
8. C

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MEASUREMENT

Content Standard 6

Classify angles as acute, obtuse, right, or straight.

Item Type

Multiple-choice

Additional Information

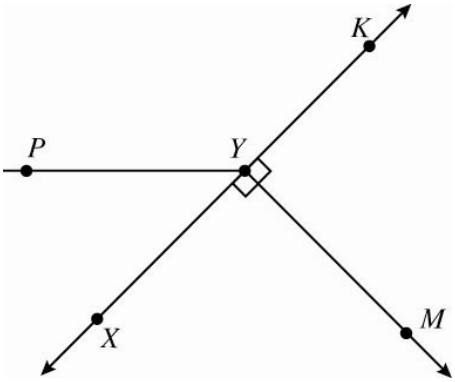
A diagram may be included.
Pictures of real-life objects may be included.
Drawing an angle on a grid may be required.

Sample Multiple-Choice Items

1. Mike drew an angle that measured more than 90° but less than 180°. What type of angle did Mike draw?

A Right
B Acute
C Obtuse*
D Straight

2. Jared drew the figure below.



What type of angle is $\angle XYK$?

A Acute
B Right
C Obtuse
D Straight*

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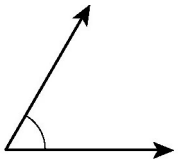
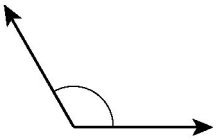
3. Which of the following angles *best* represents a right angle?

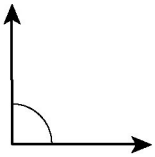
A



B



C*



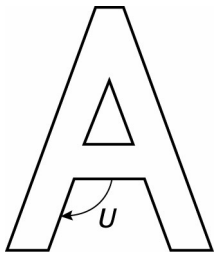
D

4. Riley rode her bicycle west on Main Street and made a 75-degree turn at Elm Street.

What kind of angle represents the 75° turn Riley made at Elm Street?

A	Straight	**C**	Obtuse
B	Right	**D**	Acute*

5. The picture below shows a magnet of the letter "A".



What type of angle does *U appear* to be?

A	Acute	**C**	Right
B	Obtuse*	**D**	Straight

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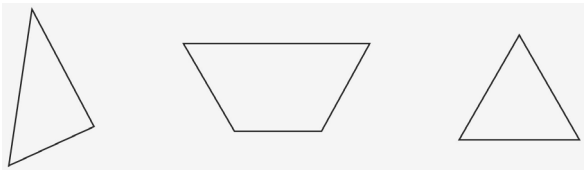
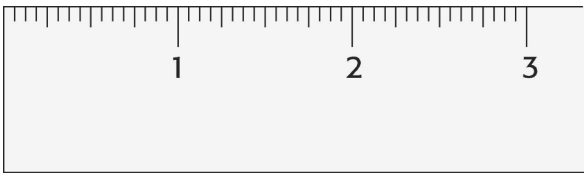
6.



What type of angle does each of the figures above have in common?

Straight	Right	Obtuse	Acute
A	**B**	**C**	**D***

7. A picture of a ruler is shown below.



What type of angles do the corners of the ruler *appear* to be?

Acute	Right	Obtuse	Straight
A	**B***	**C**	**D**

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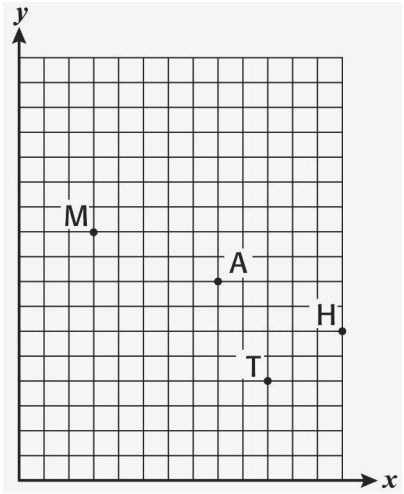
8. Stop signs are constructed in the shape of regular octagons.

Which of the following angles are at the vertices of a regular octagon?

A Acute
B Obtuse*
C Right
D Straight

9. Which type of angle is formed by connecting line segments *MA* and *AT* using point *A* as the vertex?



A Acute
B Right
C Obtuse*
D Straight

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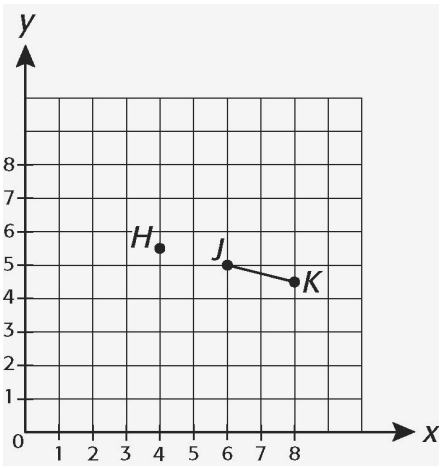
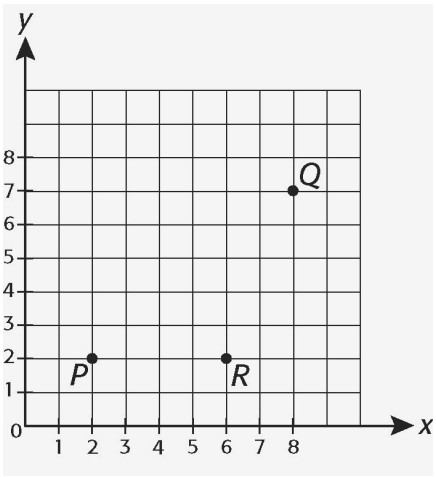
10.



If a line segment connects point *J* to point *H*, which type of angle is formed by line segment *HK*?

A Straight*
B Obtuse
C Right
D Acute

11.



Which type of angle is formed by connecting line segments *QR* and *PR*?

A Obtuse*
B Right
C Acute
D Straight

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Answer Key

Content Standard 6

Sample Multiple-Choice

1. **C**
2. **D**
3. **C**
4. **D**
5. **B**
6. **D**
7. **B**
8. **B**
9. **C**
10. **A**
11. **A**

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MEASUREMENT

Content Standard 7

Solve problems involving perimeter and area of parallelograms and rectangles.

Item Type

Multiple-choice
Gridded
Open-ended

Additional Information

Determining a missing measurement when given the area or perimeter of a parallelogram or a rectangle may be required.
Determining either the area or the perimeter of a parallelogram or a rectangle given either the area or the perimeter of the figure may be required.
Diagrams may be used.
Determining the area or perimeter of a shaded part of a figure may be required.
Word problems/real-life situations and problems in context may be used.
A comparison of figures may be required.

Sample Multiple-Choice Items

1. The front of the door to Rueben's classroom is a rectangle with an area of 2688 square inches.

If the width of the front of the door is 32 inches, what should be the measure of the height?

640 inches	116 inches	84 inches	42 inches
A	**B**	**C***	**D**

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2. The area of a parallelogram is 16 square meters. The base of the parallelogram is 8 meters.

What is the height, in meters, of the parallelogram?

2	8	24	128
A*	**B**	**C**	**D**

3. The perimeter of a square is 20 centimeters.

What is the area?

A 5 sq cm
B 25 sq cm*
C 30 sq cm
D 400 sq cm

4. The perimeter of a rectangle is 54 inches. The width of the rectangle is 8 inches.

What is the length of the rectangle?

A 16 inches
B 19 inches*
C 38 inches
D 46 inches

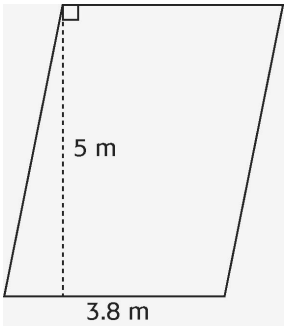
5. A diagram of an exercise mat is shown below.

The width of the mat is $\frac{1}{2}$ the length.

What is the perimeter of the exercise mat in feet?

A 4 feet
B 9 feet
C 24 feet*
D 32 feet

6. What is the area of the parallelogram shown below?



A 8.8 m^2
B 17.6 m^2
C 19.0 m^2*
D 38.0 m^2

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7. What is the area of a parallelogram with a width of 13.9 centimeters and a height of 22.4 centimeters?

A 36.3 cm^2 **C** 72.6 cm^2

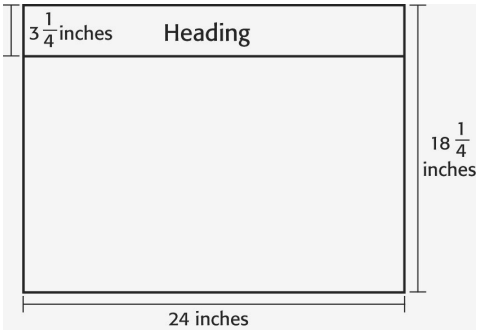
B 68.6 cm^2 **D** 311.36 cm^2*

9. What is the perimeter of a parallelogram with sides of 17 inches and 21 inches?

A 4 inches **C** 76 inches*

B 38 inches **D** 357 inches

8. A poster on Evan's wall is 24 inches wide and $18\frac{1}{4}$ inches high. On the top of the poster is a $3\frac{1}{4}$ inch heading.



What is the perimeter of the poster without the heading?

A 84 inches **C** 74 inches

B 78 inches* **D** 68 inches

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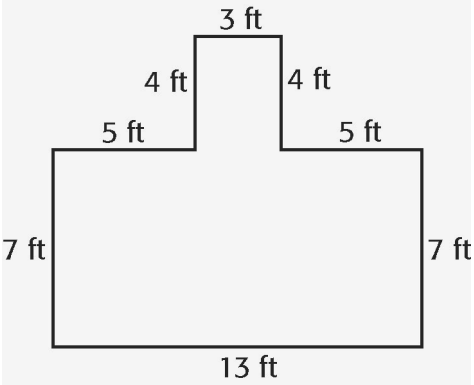
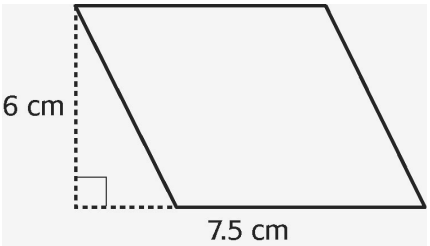
10. What is the area of the figure shown below?



A 48 square feet
B 50 square feet
C 103 square feet*
D 143 square feet

11. What is the area, in centimeters squared, of this figure?



A 45.0 cm^2*
B 27.0 cm^2
C 22.5 cm^2
D 13.5 cm^2

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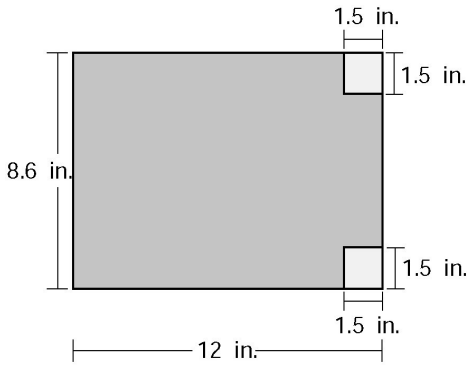
Sample Gridded Items

1. The bottom of the cage where Alex keeps his pet mouse is in the shape of a rectangle with a perimeter of 58 inches. The length of the bottom of the cage is 18.3 inches.

What is the width of the bottom of the cage?

Mark your answer in the answer grid.

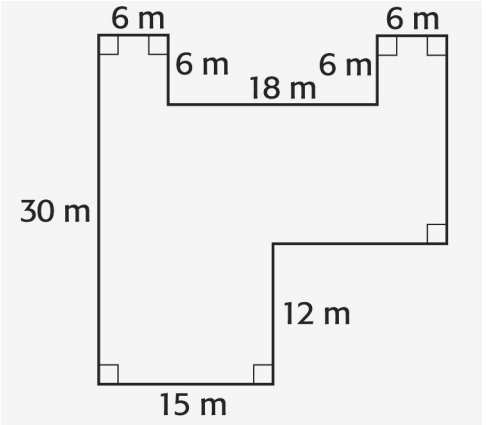
2. Sandy removed two small pieces from the large rectangle shown below.



What is the area, in square inches, of the remaining part of the original rectangle?

Mark your answer in the answer grid.

3. What is the perimeter of the figure shown below in meters?



Mark your answer in the answer grid.

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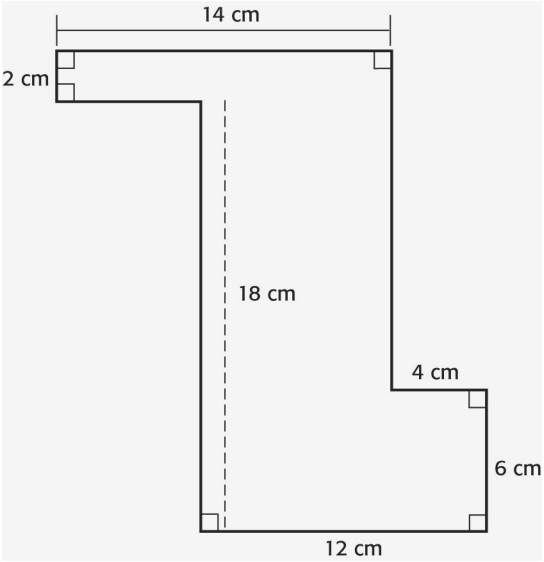
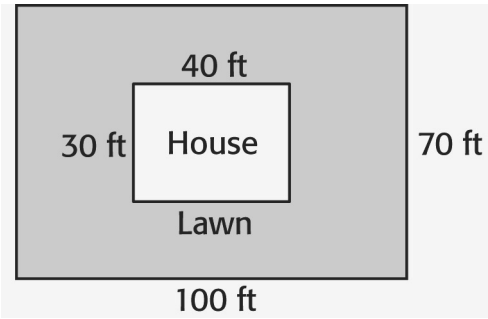
4. What is the perimeter, in centimeters, of the figure shown below?



Mark your answer in the answer grid.

5. The layout of Tim's house is rectangular and the lawn around it is also rectangular.



What is the area, in square feet, of the lawn?

Mark your answer in the answer grid.

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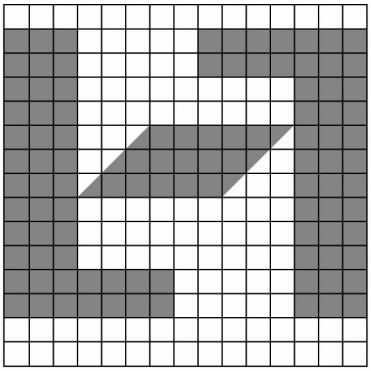
Sample Open-Ended Items

This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

1. Malcolm was given a piece of grid paper in art class and was asked to make a design with different figures. The design he made is shown below.



Scale: 1 □ = 1 square inch

a. Identify the gray, shaded geometric figures in Malcolm's design.

b. How much gray material will be used in Malcolm's design?

c. How much white material will Malcolm need for the design?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

2. The top of the Traeger family's kitchen table is square. The Reyes family's kitchen tabletop is rectangular. The perimeter of each tabletop is 18 feet.

a. Draw and label an outline of the top of the Traeger's table.

b. Draw and label *one* possible outline of the top of the Reyes's table.

c. Which table has the greatest area?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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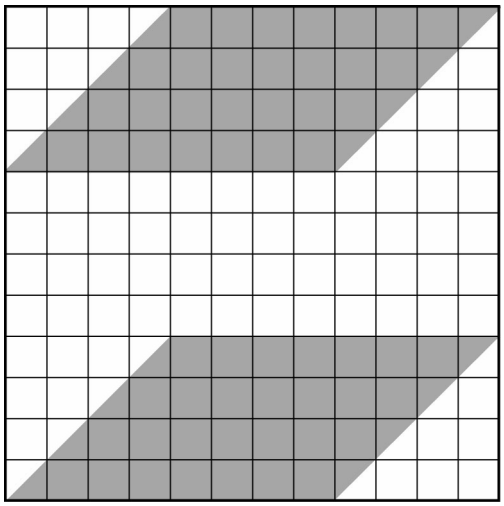
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

3. The 6th grade class at Garner Valley Middle School is planning a social event. The students on the decorating committee will use this template design to make the invitations. Each grid square is equal to 1 square inch. The invitations will be gray and white.



a. Identify the gray, shaded geometric figures in the design.

b. How much gray space is used in the invitation?

c. How much white space is used in the invitation?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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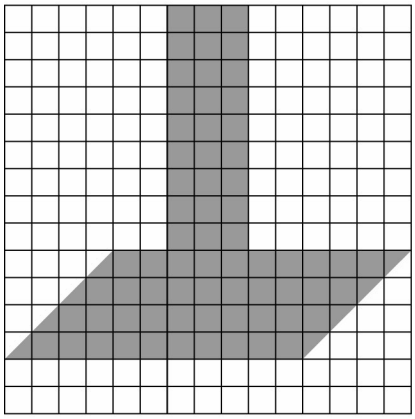
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

4. Coach Savitz is having a design painted, in gray and white paint, on the soccer field as shown below. The design will be based on the drawing on this 15 by 15 grid.

Coach Savitz's Design



Scale: □ = 1 Square foot

a. Identify the gray geometric figures in Coach Savitz's design.

b. How much gray area will be painted in Coach Savitz's design?

c. How much white area will be painted in Coach Savitz's design?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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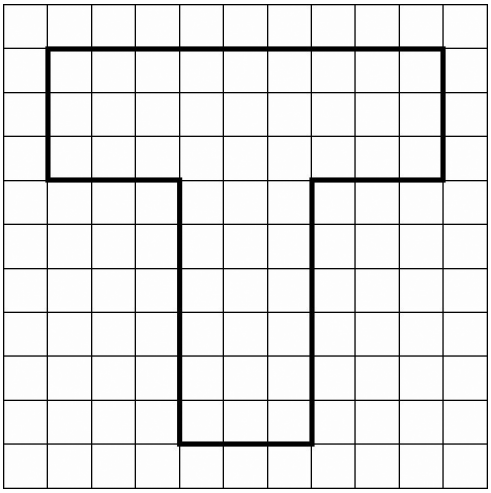
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

5. Gina is making the base of a model using toothpicks. The base resembles the letter "T". Each toothpick is equal to 3 units, so the figure has several squares, each 3 units by 3 units.



a. Find the perimeter of Gina's figure.

b. Find the area of Gina's figure.

c. If one of the 3 by 3 squares were moved to a different location than shown on Gina's drawing, would the area, perimeter, or both change or stay the same?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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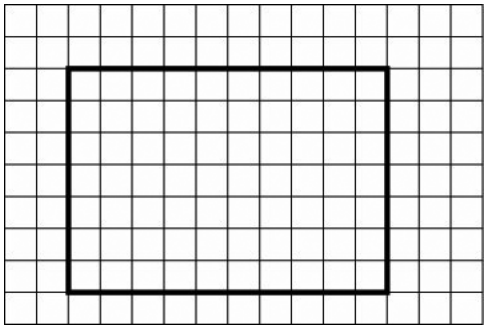
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

6.



a. What is the name of the four-sided figure shown in this grid?

b. How would you determine the area of this figure?

c. What is the area of this figure if every grid square represents 1 square meter?

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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Answer Key

Content Standard 7

Sample Multiple-Choice

1. C
2. A
3. B
4. B
5. C
6. C
7. D
8. B
9. C
10. C
11. A

Sample Gridded

1. 10.7
2. 98.7
3. 132
4. 76
5. 5800

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Sample Open-Ended

1. Sample Response(s):

a. It is made up of 4 rectangles and 1 parallelogram.

b. The area of the parallelogram is $6 \times 3 = 18$. Each "L" shape is made up of 2 rectangles. I separated them into a 12×3 rectangle and a 2×4 rectangle. Therefore, the area of one "L" shape is $36 + 8 = 44$. Since there are 2 "L" shapes, that would be 88 square inches. The amount of gray material that will be used is $18 + 88 = 106$ square inches.

OR

Area of Parallelogram: $6 \times 3 = 18$
Area of Rectangles ("L" shapes): $2(12 \times 3 + 2 \times 4) = 88$
Add the two areas together to get: 106 square inches of gray material.

OR

106 square inches of gray material. I used my calculator to find the area of each section of the rectangles (the "L" shapes) and the area of the parallelogram.

c. $225 - 106 = 119$ square inches of white material.

OR

There are a total of 225 squares. 106 of the squares are the gray material. Therefore, $225 - 106 = 119$ square inches of the white material.

OR

I used my calculator to find the total area of the template to be 225 square inches. I took the answer from **part b** and subtracted it from 225. The answer is 119 square inches of white material.

Score Point	Response Attributes
3	All is correct.
2	Two logics or explanations are correct. OR One correct logic or explanation and correct answer to at least B and C.
1	Error in logic or explanation and correct answer to two problems or drawings. OR Correct answers to one or two problems or drawings. OR One correct logic or explanation.
0	None correct. (Also, blanks, rewrites problems, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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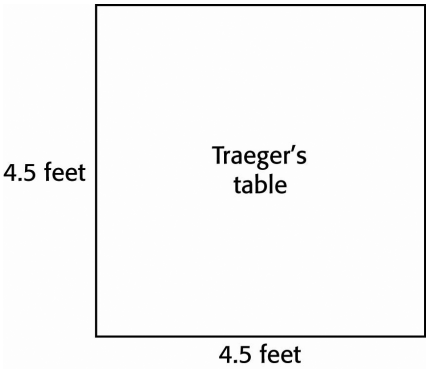
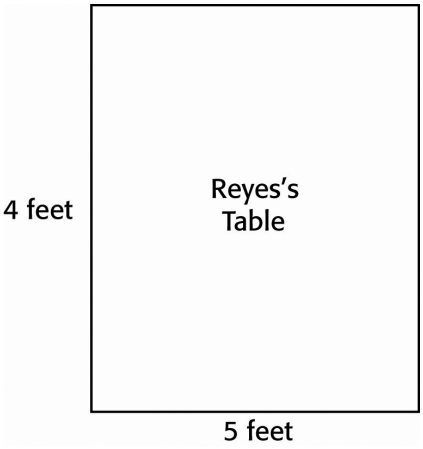
2. Sample Response(s):

a. To find Traeger's tabletop, 18 ÷ 4 = 4.5. The square tabletop has dimensions of 4.5 inches by 4.5 inches.



b. The Reyes's tabletop, with perimeter 18, is 5 inches by 4 inches, so that 5 + 4 + 5 + 4 = 18.



c. Traeger's tabletop has an area of 4.5 feet × 4.5 feet = 20.25 feet squared. Reyes's tabletop has an area of 5 feet × 4 feet = 20 feet squared. The Traeger's tabletop has the greater area.

Score Point	Response Attributes
3	All is correct.
2	The logic or explanation is correct and correct answer/drawing to at least one problem.
1	The logic or explanation is correct. OR One or more answers/drawings to problems are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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3. Sample Response(s):

a. The gray sections are parallelograms.

b. The area of each parallelogram is $8 \times 4 = 32$. There are 2 parallelograms, so $32 \times 3 = 64$.

OR

Each gray section has an area of 32 square inches. Since there are 2 parallelograms with the same area, the total to be cut off is 64 square inches.

OR

64 square inches. I used my calculator to find the area of each parallelogram, and when I found the area of one parallelogram, I multiplied it by 2 because there are 2 parallelograms.

c. $144 - 64 = 80$ square inches.

OR

There are a total of 144 squares and 64 will be cut off, so $144 - 64 = 80$. 80 squares will be used.

OR

I used my calculator to find the total area of the template to be 144 square inches. I took the answer from **part b** and subtracted it from 144. The answer is 80 square inches.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR Two correct logics or explanations and correct answer to at least **part b** and **part c**. OR One correct logic or explanation and correct answers for all problems.
1	One or more answers to problems are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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4. Sample Response(s):

a. The figure is made up of a rectangle and a parallelogram.

b. Rectangle: $9 \times 3 = 27$
Parallelogram: $11 \times 4 = 44$
$27 + 44 = 71$ square feet

OR

The rectangle is $9 \times 3 = 27$ feet squared, and the parallelogram has an area of $11 \times 4 = 44$ feet squared, so $27 + 44 = 71$ feet squared.

OR

I used my calculator to find the area of the rectangle and the area of the parallelogram for a total of 71 square feet.

c. $15 \times 15 = 225$
$225 - 71 = 154$ square feet

OR

The total area of the grid is 225 square inches. Take the answer from **part b** and subtract it from 225. The area of the white area is 154 square feet.

OR

I used my calculator to find the total area of the grid and subtracted the gray area to get 154 square feet.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR Two correct logics or explanations and correct answer to at least **part b** and **part c**. OR One correct logic or explanation and correct answers for all problems.
1	One or more answers to problems are correct.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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5. Sample Response(s):

a. The perimeter is 36 units. 3 + 3 + 6 + 3 + 6 + 3 + 3 + 9.

b. I split the "T" into two rectangles. The area of one rectangle is $3 \times 9 = 27$ units squared plus the area of the other rectangle is $3 \times 6 = 18$. Rectangle one plus rectangle two equals 45 units squared.

c. The perimeter would change if one of the toothpick squares from the inside of the figure moved, creating more lengths around the sides. The area would stay the same, because the area, 9 square units, would still be in the figure, even if it moved.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR Two correct logics or explanations and correct answer for two problems or drawings. OR One correct logic or explanation and correct answers for all problems. OR Two correct logics or explanations and correct answer for **part a** or **part b** and partial logic for **part c**.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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6. Sample Response(s):

a. Rectangle

b. To get the area of this figure, you could count the number of blocks within the dark outline. You could also use the formula for a rectangle and count the number of blocks in the length of the figure, count the number of blocks in the width of the figure, and then multiply those two numbers together.

c. $7 \times 10 = 70$ square meters.

OR

To find the area of the rectangle, multiply the length times the width. Length = 10, Width = 7, $10 \times 7 = 70$ square meters.

Score Point	Response Attributes
3	All is correct.
2	All logic(s) or explanation(s) are correct. OR Two correct logics or explanations and correct answer for two problems or drawings. OR One correct logic or explanation and correct answers for all problems. OR Two correct logics or explanations and correct answer for **part a** or **part b** and partial logic for **part c**.
1	One or more answers to problems are correct. OR One correct logic or explanation.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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MEASUREMENT

Content Standard 8

Determine the distance between two points on a scale drawing or a map using proportional reasoning.

Item Type

Multiple-choice
Gridded

Additional Information

Determining the scale may be required.
Scale drawing may be included.
Word problems/real-life situations may be used.
Measuring a scale drawing may be required.

Sample Multiple-Choice Items

1. The actual distance from a post office to an elementary school is 16.5 miles. A city map uses a scale of $\frac{1}{2}$ inch represents 15 miles.

Which of these *best* represents the distance, in inches, on the map between the post office and the elementary school?

0.55	1.1	1.65	3.3
A*	**B**	**C**	**D**

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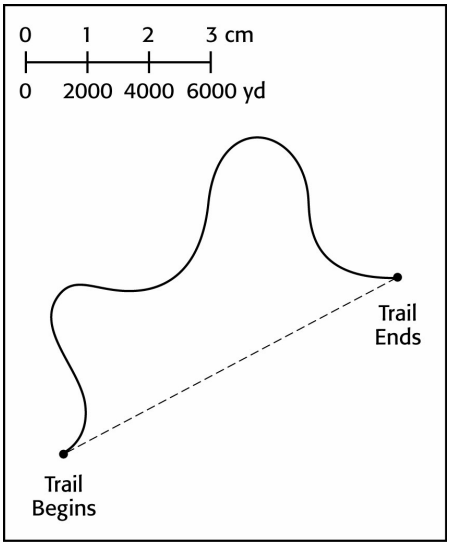
2. Use your centimeter ruler and this map to help you answer this question.

The dotted-line segment on the map shows the shortest distance from the beginning of a hiking trail to the end of a hiking trail.



Which is closest to the actual distance, in yards, represented by the dotted-line segment?

500	5000	10,000	25,000
A	**B**	**C***	**D**

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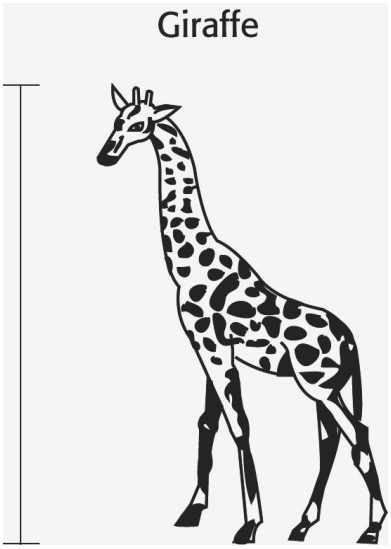
3. A scale drawing of a giraffe is shown below.



The scale used to create the drawing was 1 centimeter represents 3 feet. Using your ruler, determine the height of the actual giraffe.

6 centimeters	6.75 feet	9 centimeters	18 feet
A	**B**	**C**	**D***

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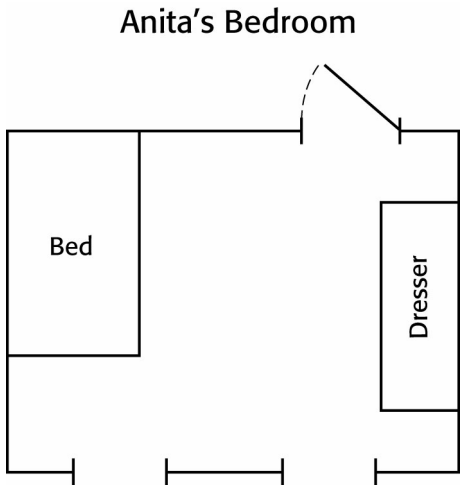
4. A scale drawing of Anita's bedroom is shown below.



Anita used a scale of 1 centimeter represents 3 feet. Using your ruler, determine the actual dimensions of Anita's bedroom.

A $4\frac{1}{2}$ centimeters by 6 centimeters

B 9 feet by 12 feet

C $13\frac{1}{2}$ feet by 18 feet*

D $13\frac{1}{2}$ meters by 18 meters

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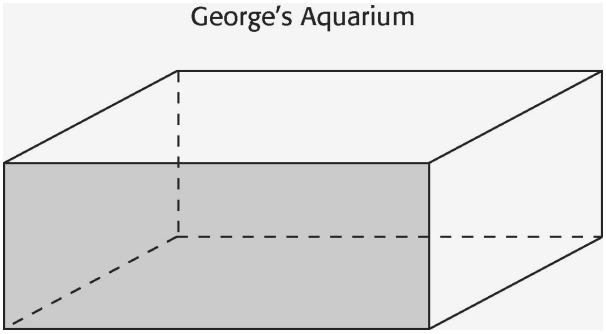
5. The scale drawing of the aquarium below is $\frac{1}{16}$ the size of the original aquarium.



Using your ruler, determine the actual measurements of the shaded face of the aquarium.

A $2\frac{1}{8}$ inches by $\frac{7}{8}$ inches

B $5\frac{1}{2}$ inches by $2\frac{2}{10}$ inches

C $18\frac{1}{8}$ inches by $16\frac{7}{8}$ inches

D 36 inches by 14 inches*

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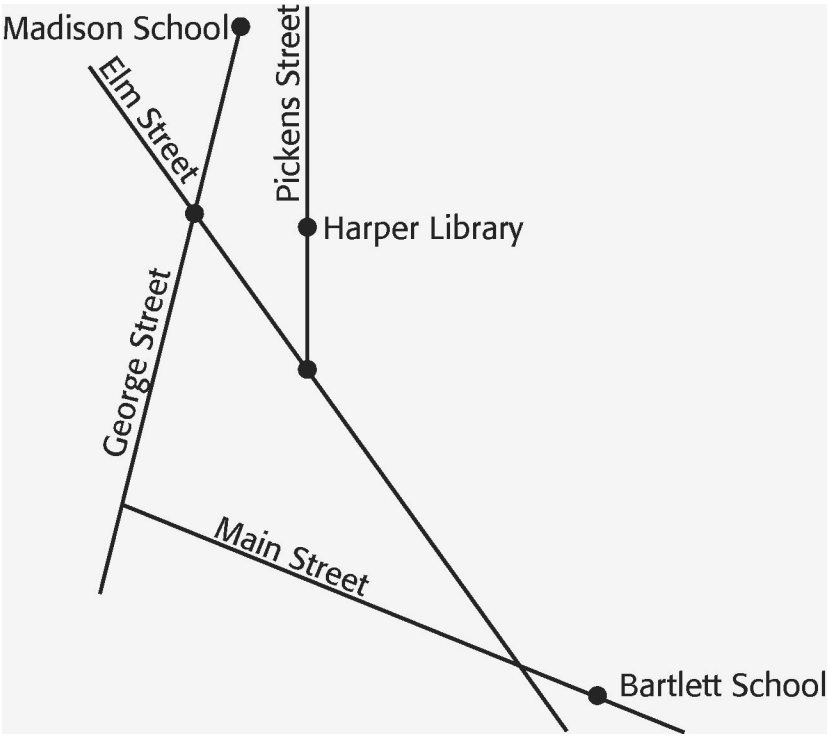
6. The map below shows the locations of Madison School, Bartlett School, and Harper Library. $\frac{1}{2}$ inch = 2 miles.



Using your inch ruler, what is the street distance, in miles, between Madison School and Harper Library?

2.75	4.75	7	11
A	**B**	**C**	**D***

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Sample Gridded Items

1. **The floor plan of the Murphy home uses a scale of 1 inch to represent 4 feet.**

   If the actual length of the Murphy living room is 18 feet, what is the length, in inches, on the floor plan?

Mark your answer in the answer grid.

2. **Harold and Danielle each drew a scale drawing of a monument. In Harold's drawing, the height of the monument was 15 centimeters and the width was 6 centimeters. Danielle's drawing of the monument was similar to Harold's. In Danielle's drawing, the height of the monument was 20 centimeters.**

   What was the width of the monument, in centimeters, in Danielle's scale drawing?

Mark your answer in the answer grid.

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Answer Key

Content Standard 8

Sample Multiple-Choice

1. A
2. C
3. D
4. C
5. D
6. D

Sample Gridded

1. 4.5
2. 8

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5. Savannah is 155 centimeters tall.

Which of the following is equivalent to 155 centimeters?

A 0.0155 m
B 0.155 m
C 1.55 m*
D 15.5 m

6. A bag of pecans that Alexis wants to buy has a total weight of 54 ounces.

Which of the following is equivalent to 54 ounces?

A 6.75 pounds
B 3.375 pounds*
C 2.25 pounds
D 1.125 pounds

7. The package of crackers that Anna bought has a mass of 49 grams.

Which of the following is equivalent to 49 grams?

A 4.9 kg
B 0.49 kg
C 0.049 kg*
D 0.0049 kg

8. Armando jumped over a puddle of water that was 76 inches wide.

Which of the following is equivalent, in feet, to the width of this puddle of water?

A $7\frac{1}{2}$ feet
B $6\frac{1}{3}$ feet*
C $6\frac{1}{4}$ feet
D $1\frac{1}{2}$ feet

9. The length of the earthworm that Timmy found in his back yard was 38 millimeters.

Which is equivalent to 38 millimeters?

A 0.038 cm
B 0.38 cm
C 3.8 cm*
D 380 cm

10. The phonebook for the city of Mapleton had a mass of 0.7 kilograms.

Which of the following is equivalent to 0.7 kilograms?

A 70 grams
B 700 grams*
C 7000 grams
D 70,000 grams

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11. David made 9 liters of fruit punch.

Which of the following is equivalent to 9 liters?

A 0.9 milliliters
B 9 milliliters
C 90 milliliters
D 9,000 milliliters*

12. Which is equivalent to 308 meters?

A 3.08 centimeters
B 30.8 centimeters
C 3080 centimeters
D 30,800 centimeters*

13. Which is equivalent to 0.79 meters?

A 7.90 km
B 0.079 km
C 0.00079 km *
D 0.0079 km

14. Which is equivalent to 0.55 kilometers?

A 55,500 cm
B 5500 m
C 550 m*
D 55 km

15. Miguel ordered a total of 18 gallons of milk for his grocery store.

Which of the following is equivalent to 18 gallons?

A 72 quarts*
B 144 cups
C 288 fluid ounces
D 2304 pints

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Answer Key

Content Standard 9

Sample Multiple-Choice

1. **C**
2. **A**
3. **C**
4. **D**
5. **C**
6. **B**
7. **C**
8. **B**
9. **C**
10. **B**
11. **D**
12. **D**
13. **C**
14. **C**
15. **A**

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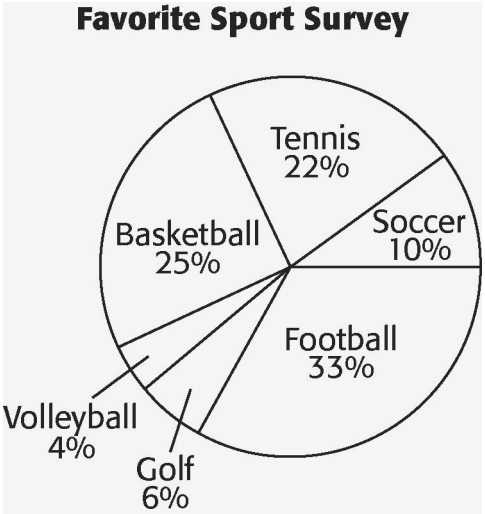
2. The graph shows the results of a survey about the favorite sport of a group of 300 students from Mr. Jahn's gym classes.



What was the total number of students in the group who chose football as their favorite sport?

33	75	99	150
A	**B**	**C***	**D**

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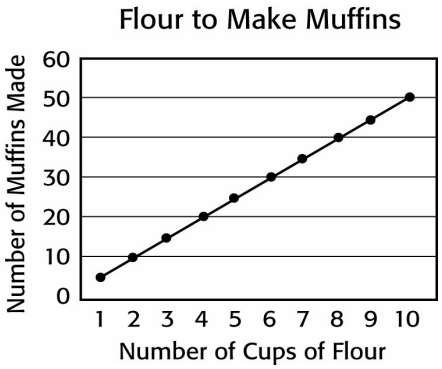
Sample Gridded Items

1. The graph below displays the sales amounts for puzzles over a number of years.

By how many dollars did the sales of puzzles increase from 1996 to 1998?

Mark your answer in the answer grid.

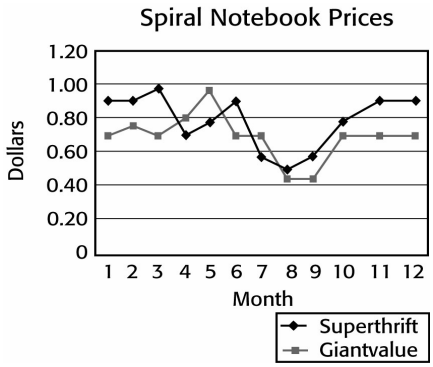
2. The line graph below displays the amount of flour needed in a muffin recipe.



Based on this graph, what is the number of cups of flour needed to make 40 muffins?

Mark your answer in the answer grid.

3. The graph below displays the price of spiral notebooks at two different stores over a 12-month period.



Which month appears to have had the *least* difference in price of spiral notebooks at the two stores?

Mark your answer in the answer grid.

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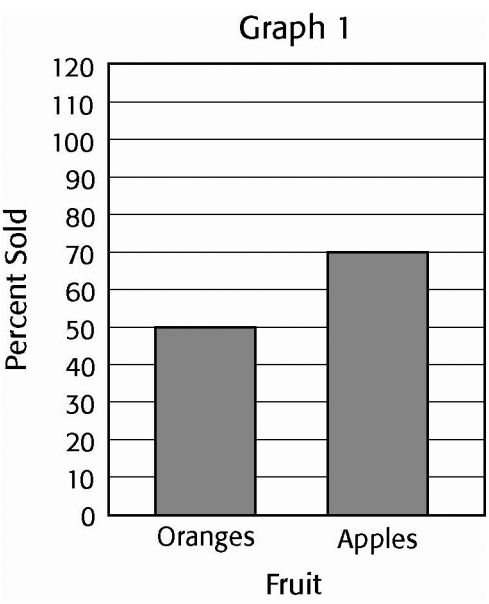
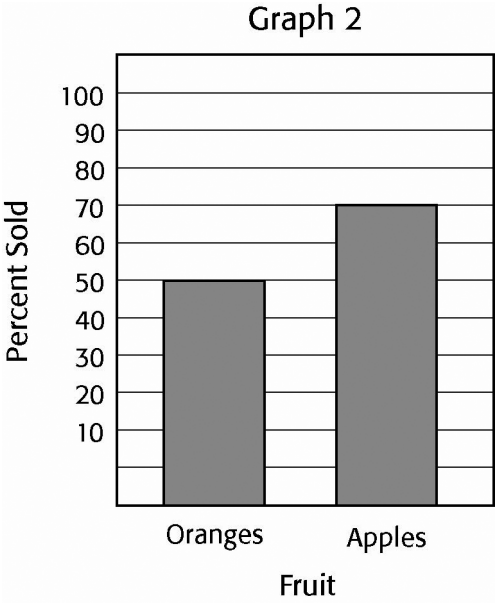
This problem requires you to show your work and/or explain your reasoning. You may use drawings, words, and/or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning. It is important that you show all your work.

2. The number of oranges and apples sold at a produce stand are shown in this table.

	Number Displayed	Number Sold
Oranges	**70**	**35**
Apples	**90**	**63**

Mrs. Valdez wants to use one of the graphs below to display the percent of oranges and apples she sold in her produce stand.





a. Does one bar graph more accurately present the data than the other bar graph? Explain how you arrived at your answer.

b. In a sentence or two, state how the less accurate bar graph could be changed so that it would better represent the data in the table.

Show all your work and/or explain your reasoning *for each part* in the space provided in the answer document.

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Answer Key

Content Standard 10

Sample Multiple-Choice

1. C
2. C

Sample Gridded

1. $150000 or $150000.00 or 150000 or 150000.00
2. 8
3. 8

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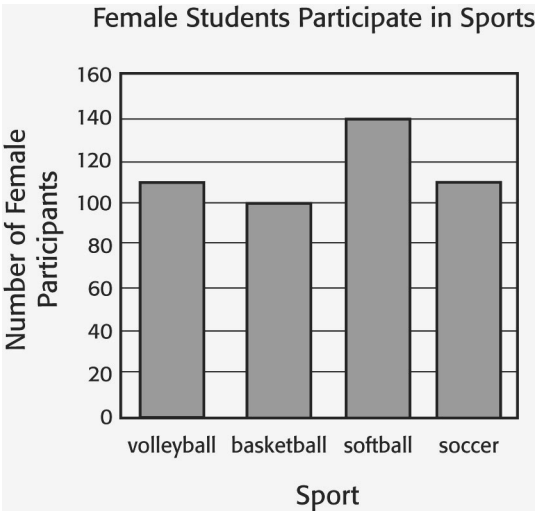
Sample Open-Ended

1. Sample Response(s):

a. I would not accept this graphic, because the intervals make it visually misleading. The vertical axis does not start at zero and the difference between softball and basketball participation appears to be more substantial than it actually is.

A better representation would include a bar graph or a circle graph drawn to scale.

b.



I chose this graph to represent the newspaper article, because a bar graph is okay for this type of representation. In the original question, the vertical axis was wrong. It needs to start at zero as mine does, that way it does not look like softball is twice as popular as basketball.

Score Point	Response Attributes
3	All is correct.
2	All logics or explanations are correct. OR One logic or explanation and graph are correct.
1	One logic is correct. OR The graph has no more than three errors.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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2. Sample Response(s):

a. Graph 1 displays the data more accurately than Graph 2. Graph 2 is misleading, because the first interval on the y-axis is much larger than all the other intervals. This makes the number of oranges sold appear much closer to the number of oranges displayed.

b. How the student could possibly better the less accurate graph will vary. Students might possibly state that the vertical axis should have all the same sized intervals beginning at zero.

Score Point	Response Attributes
3	All is correct.
2	The logic or explanation is correct for **part a** or **part b**.
1	Identify which is more accurate.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

3. Sample Response(s):

The graph on the right is more accurate than the graph on the left. The graph on the left does not begin with 0 on the vertical axis.

Score Point	Response Attributes
3	Picked one and fully justified with logic to support the selection.
2	Picked one and did not fully support the selection.
1	Picked one with no supporting logic.
0	None correct. (Also, blanks, rewrites problem, foreign language, illegible, refusals, off task, etc., scored as invalid.)

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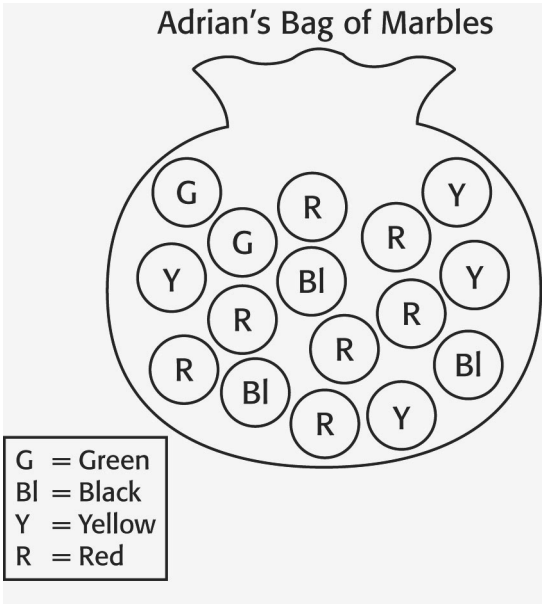
2. The picture below represents Adrian's bag of marbles. All of the marbles are the same size and shape.



What is the probability that Adrian will *not* select a yellow or red marble, without looking, on his first try?

$\frac{3}{10}$	$\frac{7}{10}$	$\frac{5}{16}$	$\frac{5}{32}$
A	**B**	**C***	**D**

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3. Trudie is playing a game with identical-sized colored sticks. She has a container with a total of 10 red, 12 green, 19 blue, and 9 yellow sticks.

If Trudie picks a stick without looking, what is the probability the stick will be green?

12%	24%	76%	88%
A	**B***	**C**	**D**

4. There are 12 students playing a game that requires each one to pick a piece of paper from a hat. The pieces of paper are identical in size and on each of the pieces is the name of a different student playing the game.

What is the probability that a student will pick the piece of paper from the hat with his or her own name?

$\frac{1}{12}$	$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$
A*	**B**	**C**	**D**

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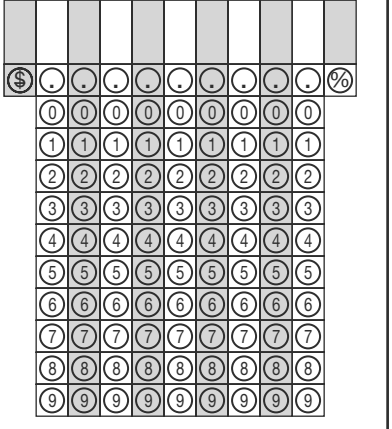
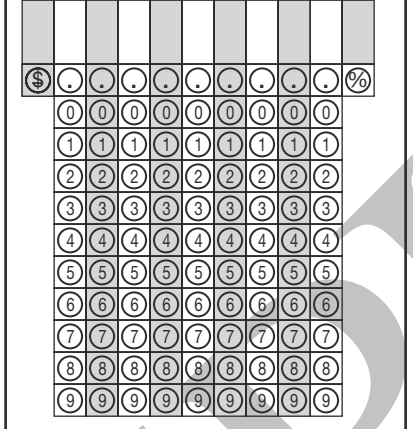
SAMPLE RESPONSE: GRIDDED

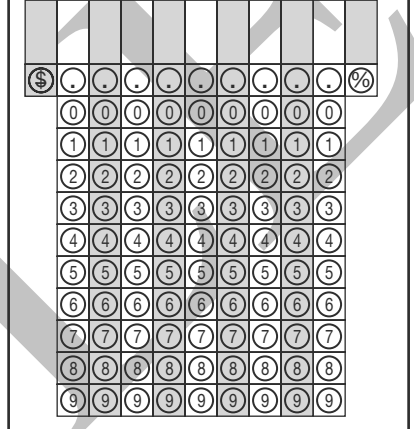
1



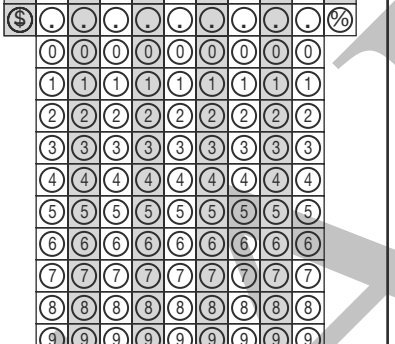
2



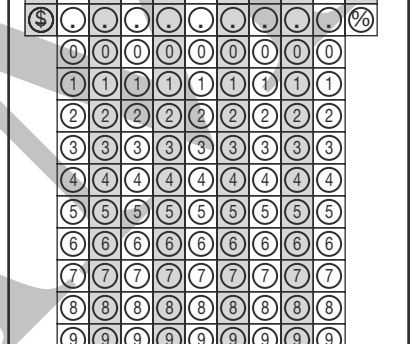
3



4



5



SAMPLE

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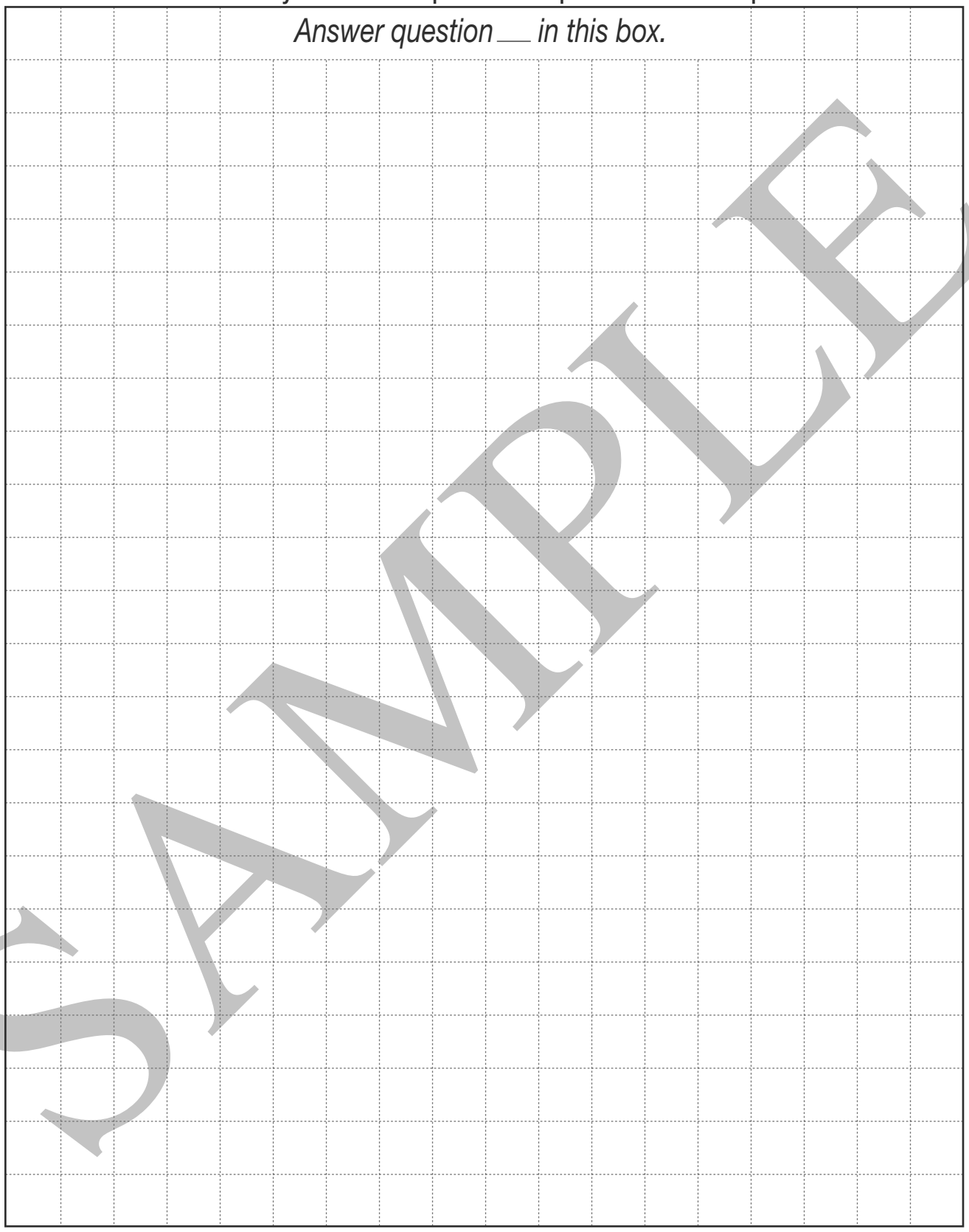
SAMPLE RESPONSE: OPEN-ENDED

Be sure to leave room in your answer space for all parts of this test question.



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SAMPLE

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