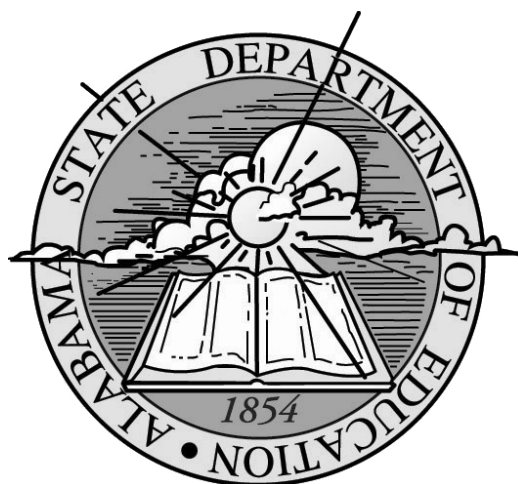# Alabama Reading and Mathematics Test[+]

Item Specifications

for

Mathematics
Grade 6

Alabama State Department of Education
Montgomery, Alabama
December 2011

NUMBER AND OPERATIONS

Content Standard 1

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

Item Type

Multiple-choice

Additional Information

Mixed numbers or improper fractions may be used.
Common and uncommon denominators may be used.
Fractions may be in simplest form.
No word problems/context problems will be used.

Sample Multiple-Choice Items

1. $73.51 + 16.02 = \square$

57.31	57.49	89.53	90.53
A	B	C *	D

3. $16.83 - 4.7 = \square$

30.17	21.53	12.87	12.13
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

4. $6.4 \times 2.3 = \square$

14.72	8.7	3.2	2.2
A *	B	C	D

5

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

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

B $\dfrac{42}{5}$ ✱　　**D** $\dfrac{2}{7}$

8.
$$\dfrac{7}{8}$$
$$-\dfrac{1}{3}$$

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

A ✱　　**B**　　**C**　　**D**

---

6. $3.12 \div 0.6 = \square$

A 3.76　　　**C** 1.872

B 2.52　　　**D** 5.2 ✱

---

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

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

A　　**B** ✱　　**C**　　**D**

7.
$$\dfrac{7}{9}$$
$$+\dfrac{7}{18}$$

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

A　　**B** ✱　　**C**　　**D**

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**

7

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.
Word problems may be used.
Fractions in their simplest form may be required.
Determining ratio or proportion may be required.
Determining the percent of change may be required.

Sample Multiple-Choice Items

8

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.

Sugar

$\frac{1}{3}$ cup

How many 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

9

3. 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**

Sample Gridded Items

1. 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.

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

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

   Mark your answer in the answer grid.

3. 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. 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.

4. 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. 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.

Sample Open-Ended Items

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

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 or explain your reasoning *for each part* in the space provided in the answer document.

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

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 2,604 envelopes?

Show all your work 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 all your work or explain all your reasoning. You may use drawings, words, or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning.

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 or explain your reasoning *for each part* in the space provided in the answer document.

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

4. The band room has 4 kinds of instruments: flutes, trumpets, violins, and drums.

    a. One-fourth of the instruments are flutes and one-sixth of the instruments are trumpets. What fraction of all of the instruments are flutes and trumpets?

    b. There are more violins than trumpets. There are more drums than violins. What fraction of the instruments could be violins?

    c. What fraction of the instruments could be drums?

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

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

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 or explain your reasoning *for each part* in the space provided in the answer document.

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

6. Timothy conducted a survey in which he asked 250 people the number of times they visited a state park last year.

    a. In Timothy's survey, 20% of the people said they visited a state park exactly 6 times last year. What is the number of people in Timothy's survey that visited a state park exactly 6 times last year?

    b. In his survey, 110 people said they visited a state park exactly 2 times last year. What percent of people in Timothy's survey visited a state park exactly 2 times last year?

    c. Timothy said that exactly 43% of the people in his survey never visited a state park last year. Explain why Timothy's statement must be incorrect.

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

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

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 or explain your reasoning *for each part* in the space provided in the answer document.

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

8. Dan, Jeremy, and Charles each bought 3 jars of salsa for every 4 bags of chips purchased.

   a. Dan bought 9 jars of salsa. How many bags of chips did he purchase?

   b. Jeremy bought 20 bags of chips. How many jars of salsa did he purchase?

   c. Explain why you know that Charles did not purchase 8 jars of salsa.

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

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

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 percentage of change in the value of the computer?

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

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

10. James, Caleb, and Abigail bought a pizza. James ate $\frac{1}{6}$ of the pizza and Caleb ate $\frac{1}{4}$ of the pizza.

    a. What fraction of the pizza did James and Caleb eat altogether?

    b. Abigail ate $\frac{2}{5}$ of the pizza that was remaining. What fraction of the original whole pizza did Abigail eat?

    c. They also bought a pie. James, Caleb, and Abigail shared $\frac{1}{2}$ of the pie. They each had the same fraction of pie. What fraction of the pie did each of them eat?

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

Answer Key

Content Standard 2

Sample Multiple-Choice

1. **A**
2. **A**
3. **C**

Sample Gridded

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

22

ALGEBRA

Content Standard 3

Solve problems using numeric and geometric patterns.

Item Type

Multiple-choice
Gridded

Additional Information

Pictures or objects may be used.
Determining a rule may be required.
Tables and charts may be used.
Word problems and problems in context may be used.
Fractions 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. The table below shows the amount of money Tim has saved by the end of each week.

Tim's Savings

Week	Amount Saved
1	$4.00
3	$7.50
4	$9.25
5	$11.00
9	$18.00

If the pattern continues, how much money should Tim save each week?

$1.75	$2.00	$2.50	$7.00
A *	B	C	D

4. Elizabeth started the pattern shown below.

1st   2nd   3rd   4th   5th
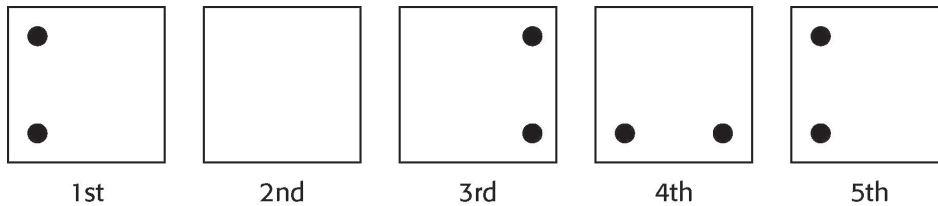
Which of the following should Elizabeth have drawn as the second figure?

A   B *   C   D

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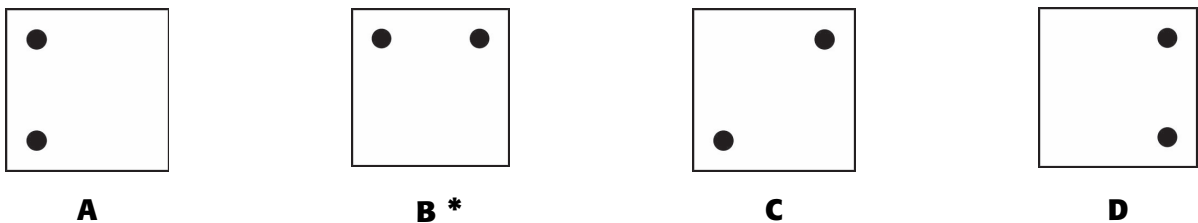
5. Miriam created the tile pattern shown below.
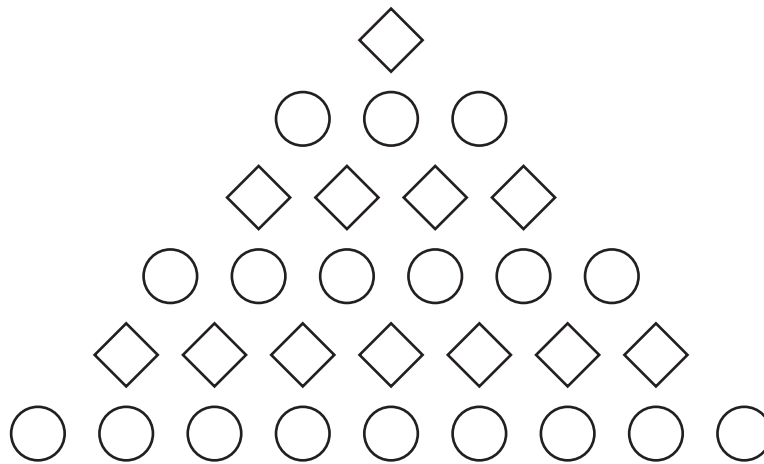
If the pattern continues, how many diamonds and circles should be in the next two rows in the pattern?

A 10 diamonds, 11 circles

B 10 diamonds, 12 circles *****

C 11 diamonds, 12 circles

D 11 diamonds, 13 circles

6. Victor started this doubling pattern.
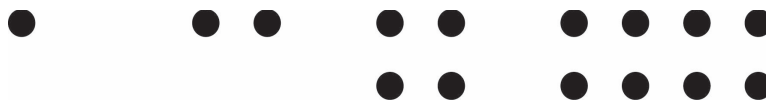
If the pattern continues as shown, how many dots should Victor draw in the next figure?

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

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. The table below shows the number of minutes volunteers read to a kindergarten class.

Volunteer Readers

Week	Number of Minutes
1	35
2	36
3	39
4	44
5	
6	?

If the pattern continues, how many minutes should the volunteers read to the kindergarten class during week 6?

48   54   58   60

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

36

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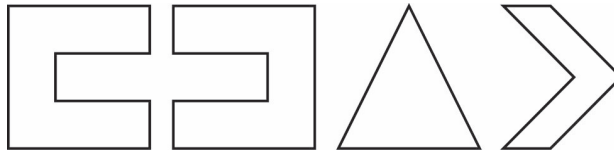
   If the 4 shapes above keep repeating in this order, how many triangles are in the pattern?

Mark your answer in the answer grid.

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 total pennies did Ashley bring 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.

5. It takes Darren 8 minutes to prepare his supplies to make 6 bracelets. Each bracelet will take 5 minutes to make.

What is the *least* amount of time, in minutes, it will take Darren to prepare his supplies and make 6 bracelets?

Mark your answer in the answer grid.

6. Kris made the pattern shown below.

89, 92, 81, 84, 73, 76, 65,

If the pattern continues, what should be the 11th number in the pattern?

Mark your answer in the answer grid.

Answer Key

Content Standard 3

Sample Multiple-Choice

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

Sample Gridded

1. **162**
2. **8**
3. **255**
4. **34**
5. **38**
6. **49**

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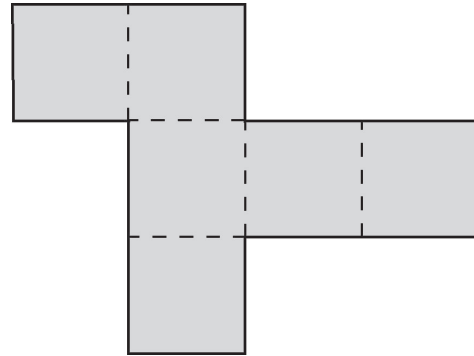
    Which of these figures could be formed if the net was folded along the dotted line segments?

    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   **C** Hexagon *

B Pentagon   **D** Octagon

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

A Trapezoid   **C** Rhombus *

B Rectangle   **D** Parallelogram

5. Tek has a figure with *exactly* one rectangular base.

Which of the following could be the shape of Tek's figure?

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

6. Which of the following figures is an octagon?

A   **C**

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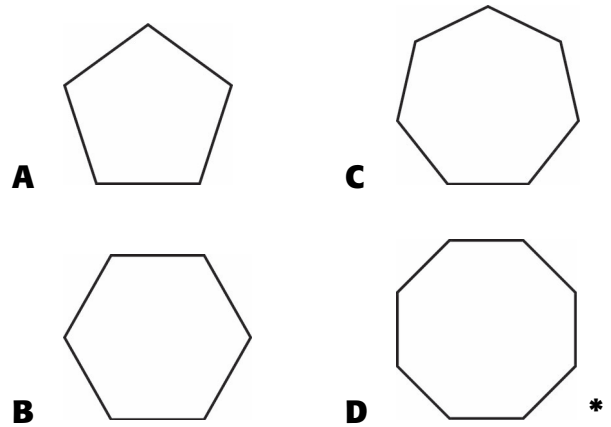
7. Lyle designed a garden so that it had seven equal sides.

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 *

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

A Parallelogram   **C** Hexagon
B Pentagon *   **D** Octagon

9. April made a sign with exactly one set of parallel sides and exactly one set of congruent sides.

   Which could be the shape of the sign?

A Isosceles trapezoid *
B Isosceles triangle
C Regular quadrilateral
D Regular triangle

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.
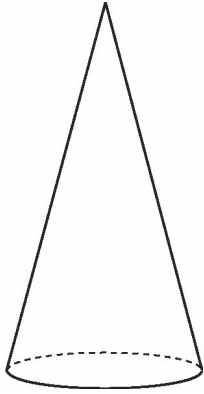
Which of the following names the figure Alyssa drew?

A Cone *
B Cylinder
C Pyramid
D Sphere

14. 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

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

Answer Key

Content Standard 4

Sample Multiple-Choice

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

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. Beverly graphed 4 points on the grid below.
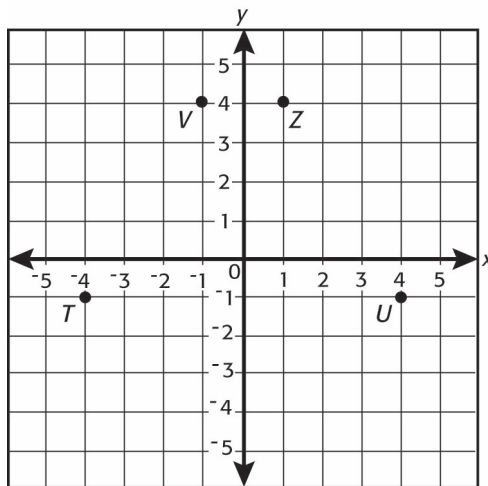
    Which of the following points *best* represents the coordinates (⁻1, 4)?

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

2. Josh made a graph of his newspaper route. He starts at (4, 5), continues to (⁻5, 3) and (⁻2, ⁻3), and then returns to where he started.

   Which of the following shows Josh's newspaper route?

A

C

B *

D

47
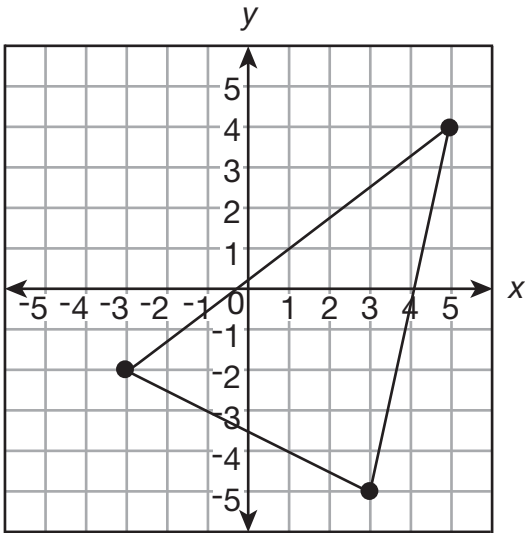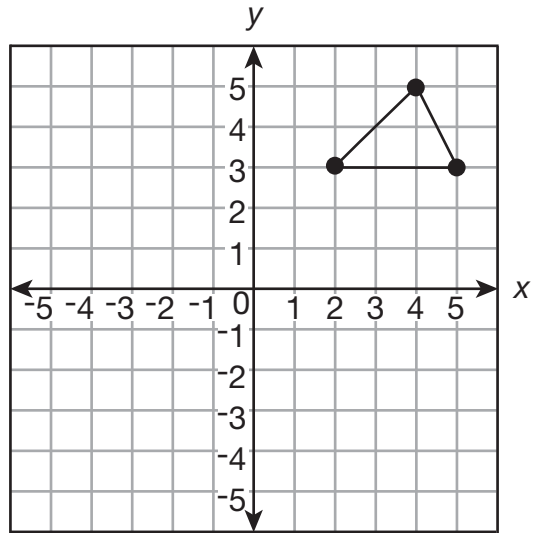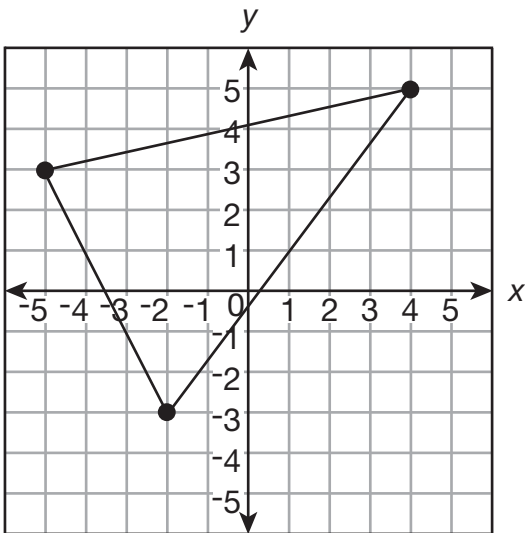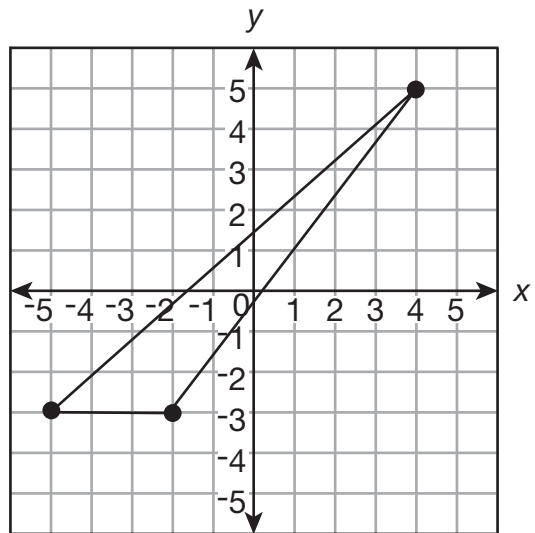
3. The grid below shows the location of Mr. Lang's classroom.
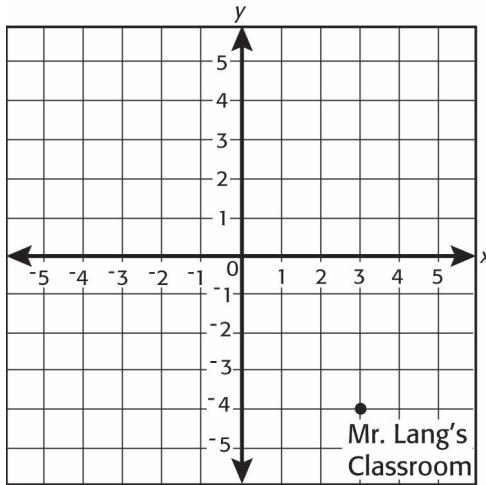
Which *best* represents the coordinates of Mr. Lang's classroom?

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

4. The grid below shows the locations of points *H*, *J*, *K*, and *L*.
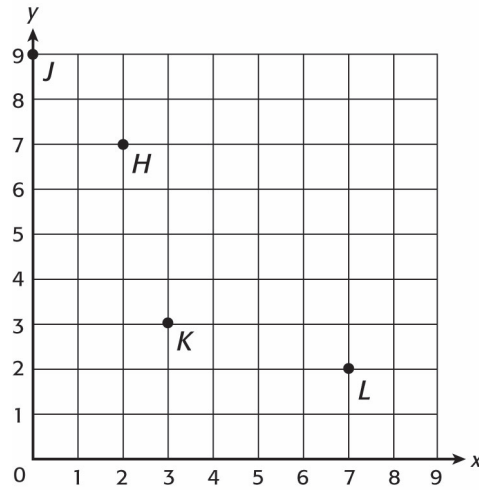
Which point on the grid is *best* represented by the ordered pair (7, 2)?

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

5. Kendra graphed point *K* on the grid below.
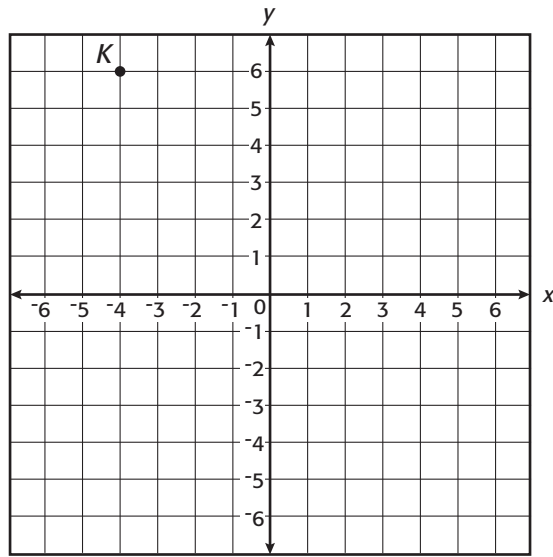
Which ordered pair *best* represents the location of point *K*?

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

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6. The grid below shows the location of 4 vertices of a square.
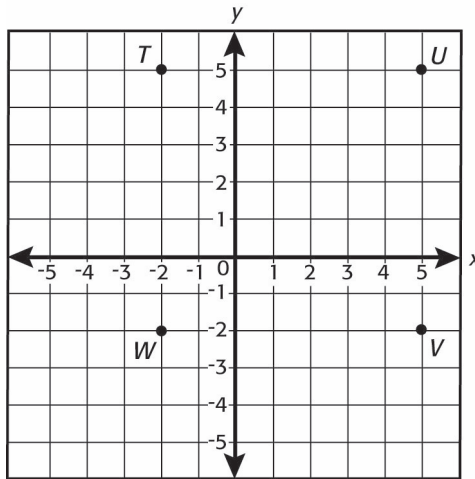
Which vertex of the square is located at point (5,⁻2) on the grid?

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

Answer Key

Content Standard 5

Sample Multiple-Choice

1. **C**
2. **B**
3. **B**
4. **D**
5. **B**
6. **C**

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.

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   **C** Obtuse *

   B Acute   **D** Straight

2. Jared drew the figure below.
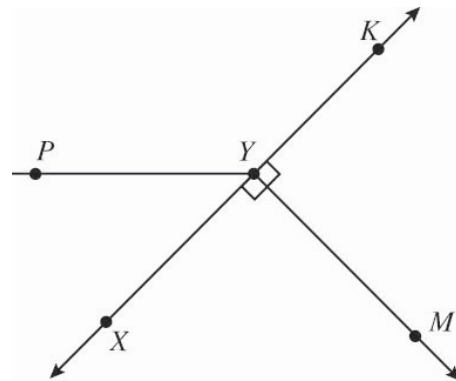
   What type of angle is ∠XYK?

   A Acute   **C** Obtuse

   B Right   **D** Straight *

53

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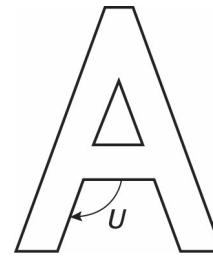
A

B

C *

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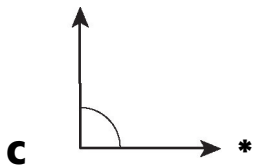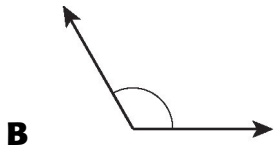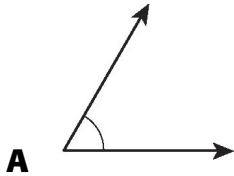
4. Riley rode her bicycle west on Main Street and made a 75-degree turn at Elm Street.

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

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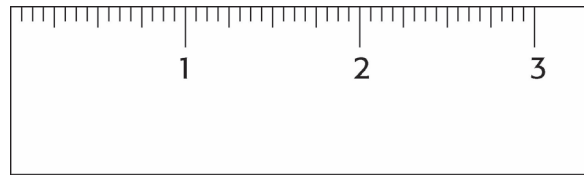
B Right   **D** Acute **＊**

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

   U

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

A Acute   **C** Right

B Obtuse **＊**   **D** Straight

6. A picture of a ruler is shown below.

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

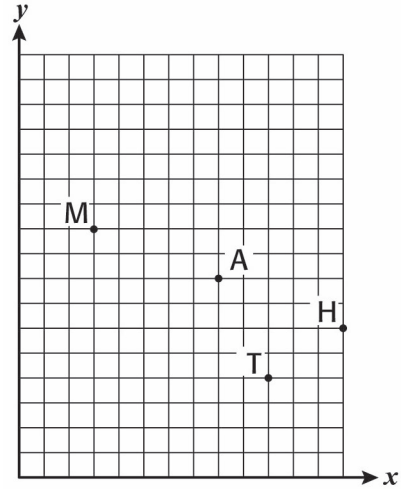| Acute	Right	Obtuse	Straight
A	**B** *	**C**	**D**

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

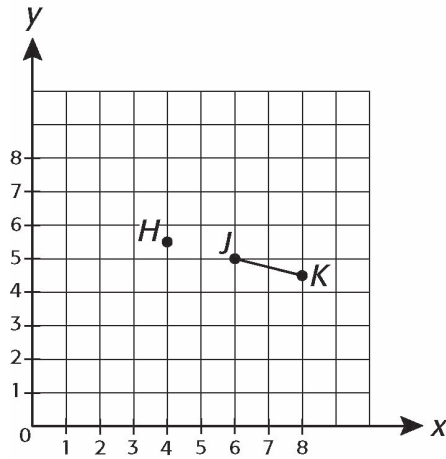   Which of the following angles are at the vertices of a regular octagon?

    A Acute

    C Right

    B Obtuse *

    D Straight

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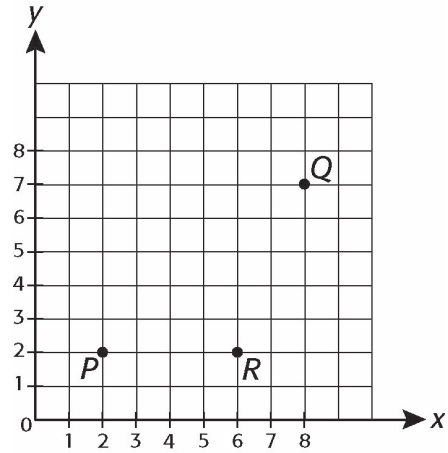

    A Acute

    C Obtuse *

    B Right

    D Straight

9. Points *H*, *J*, and *K* and line segment *JK* are shown below.

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

A Straight *

C Right

B Obtuse

D Acute

10. Points *P*, *Q*, and *R* are shown below.

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

A Obtuse *

C Acute

B Right

D Straight

57

Answer Key

Content Standard 6

Sample Multiple-Choice

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

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 2,688 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**

59

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 |

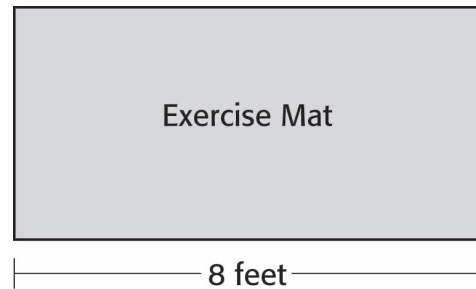3. The perimeter of a square is 20 centimeters.

What is the area?

A 5 sq cm   C 30 sq cm

B 25 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   C 38 inches

B 19 inches *   D 46 inches

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

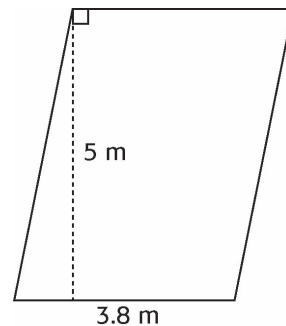Exercise Mat

├──────── 8 feet ────────┤

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

What is the perimeter of the exercise mat in feet?

A 4 feet   C 24 feet *

B 9 feet   D 32 feet

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

5 m

3.8 m

A 8.8 sq m   C 19.0 sq m *

B 17.6 sq m   D 38.0 sq m

60

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 sq cm   **C** 72.6 sq cm

B 68.6 sq cm   **D** 311.36 sq cm *

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

A 4 inches   **C** 76 inches *
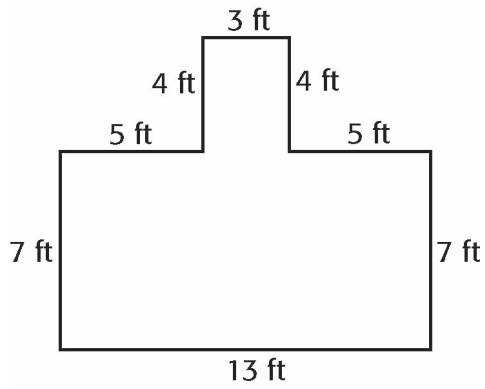
B 38 inches   **D** 357 inches

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.
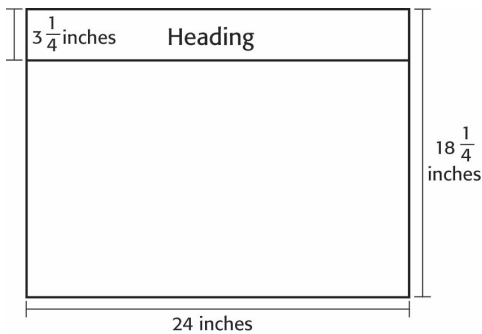
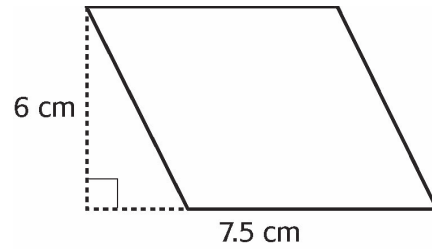What is the perimeter of the poster without the heading?

A 84 inches   **C** 74 inches

B 78 inches *   **D** 68 inches

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

3 ft

4 ft | 4 ft

5 ft | 5 ft

7 ft | 7 ft

13 ft

A 48 square feet   **C** 103 square feet *

B 50 square feet   **D** 143 square feet

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

6 cm

7.5 cm

A 45.0 sq cm *   **C** 22.5 sq cm
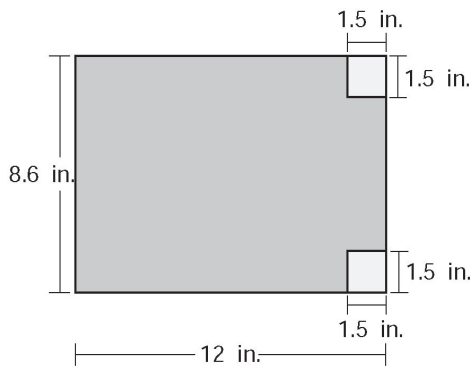
B 27.0 sq cm   **D** 13.5 sq cm

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?

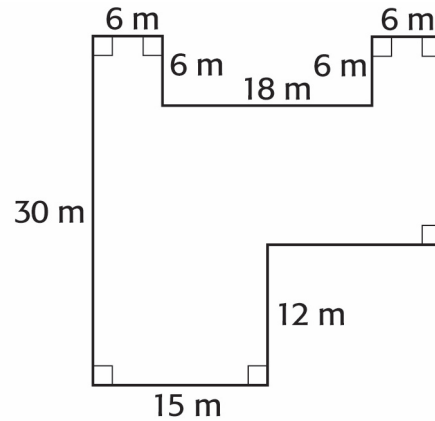   Mark your answer in the answer grid.

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?
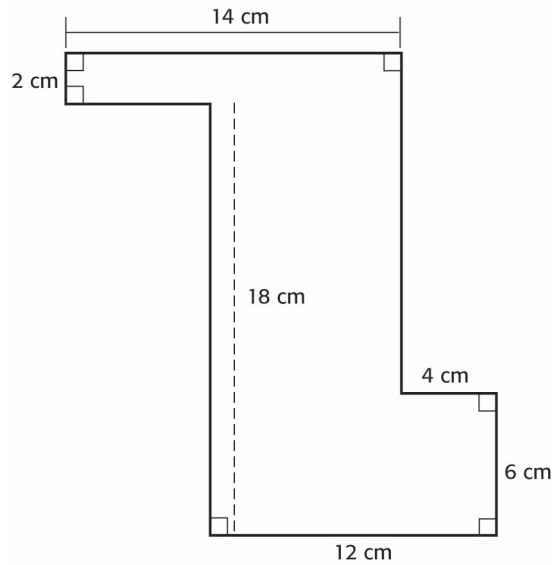
   Mark your answer in the answer grid.

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

   Mark your answer in the answer grid.

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

14 cm

2 cm

18 cm

4 cm

6 cm

12 cm

Mark your answer in the answer grid.

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

40 ft

30 ft | House | 70 ft

Lawn

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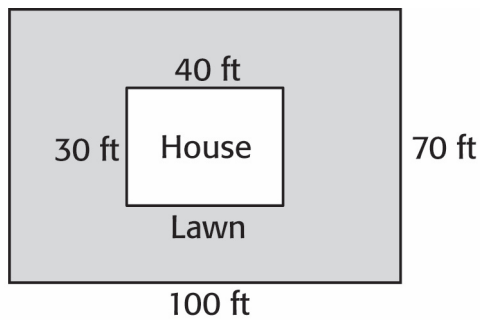
What is the area, in square feet, of the lawn?

Mark your answer in the answer grid.

Sample Open-Ended Items

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

---

1. Jason is making a poster. He buys a piece of rectangular poster board that is 24 inches by 30 inches. From the piece of poster board, he is going to make two identical rectangular posters.

    a. What is the *greatest* area each poster can have?

    b. Using the entire poster board, how could Jason cut the poster board into two identical rectangles with the *least* perimeter?

    c. Using the entire poster board, what is the *least* perimeter each poster can have?

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

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

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 or explain your reasoning *for each part* in the space provided in the answer document.
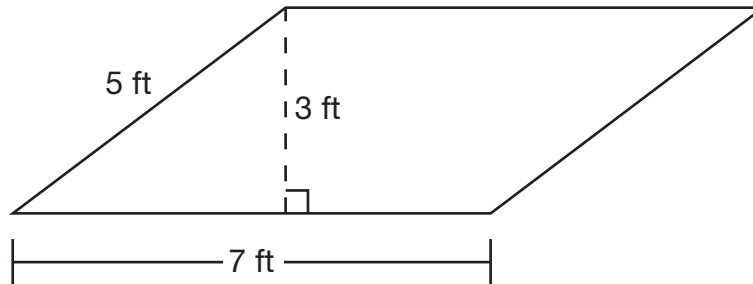
66

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

3. Frank has a rug in the shape shown below.

5 ft

3 ft

7 ft

a. What is the area, in square feet, of Frank's rug?

b. What is the perimeter, in feet, of Frank's rug?

c. Frank has a rectangular blanket with the same perimeter as the rug and a width of 3 feet. What is the length, in feet, of Frank's blanket?

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

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

4. Darcy is drawing three different rectangles that each have a perimeter of exactly 24 inches.

    a. The first rectangle has a length of 10 inches. What is the width of the first rectangle?

    b. The second rectangle has an area of 35 square inches. What are the length and width of the second rectangle?

    c. The third rectangle is a square. How many inches long is each side of the square?

Show all your work or explain your reasoning *for each part* in the space provided in the answer document.
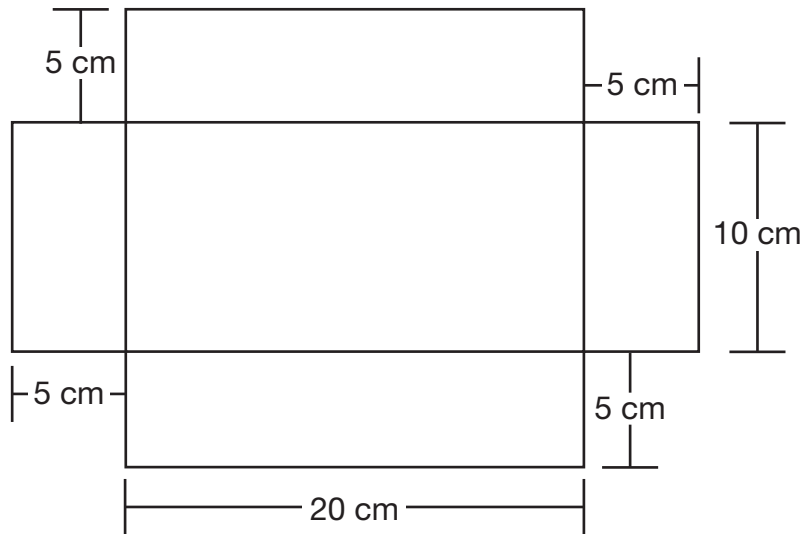
68

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

5. Jamar drew two figures using 5 rectangles that could be folded into an open box. The first figure is shown below.

a. What is the total area, in square centimeters, of the 5 rectangles?

b. Jamar's second figure had 5 squares that could be folded into an open box which had the same total area as the first figure. Each of the squares had the same area. What is the length, in centimeters, of each of the sides of the squares?

c. What is the perimeter, in centimeters, of each of the squares in Jamar's second figure?

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

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

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**

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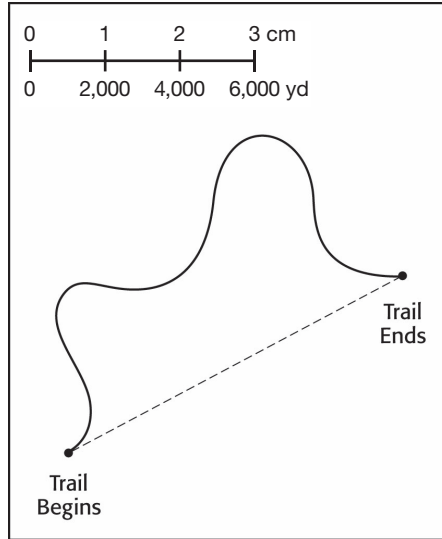
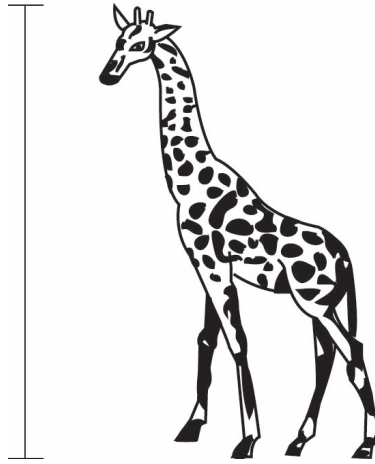   Which is *closest* to the actual distance, in yards, represented by the dotted-line segment?

500	5,000	10,000	25,000
A	**B**	**C ***	**D**

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

Giraffe

The scale used to create the drawing was 1 centimeter represents 3 feet.
Using your ruler, determine the height of the actual giraffe.
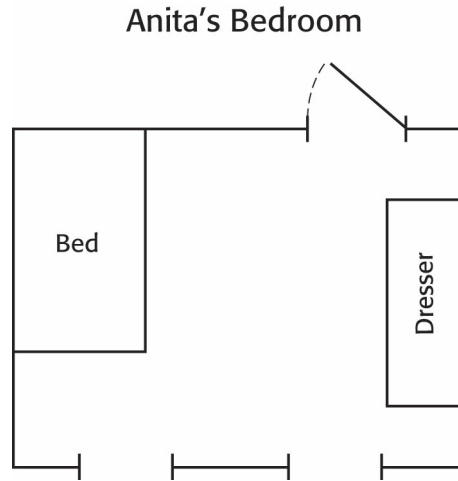
6 centimeters	6.75 feet	9 centimeters	18 feet
A	**B**	**C**	**D** *

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

Anita's Bedroom

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

5. The actual distance from Jarret's home to Lake Mitchell is 140 miles. The distance on a map is 3.5 inches.

   What scale could have been used for the map?

A 1 inch = 4 miles

B 1 inch = 40 miles *

C 1 inch = 137.5 miles

D 1 inch = 490 miles

6. The map below shows the locations of Madison School, Bartlett School, and Harper Library. $\frac{1}{2}$ inch = 2 miles.
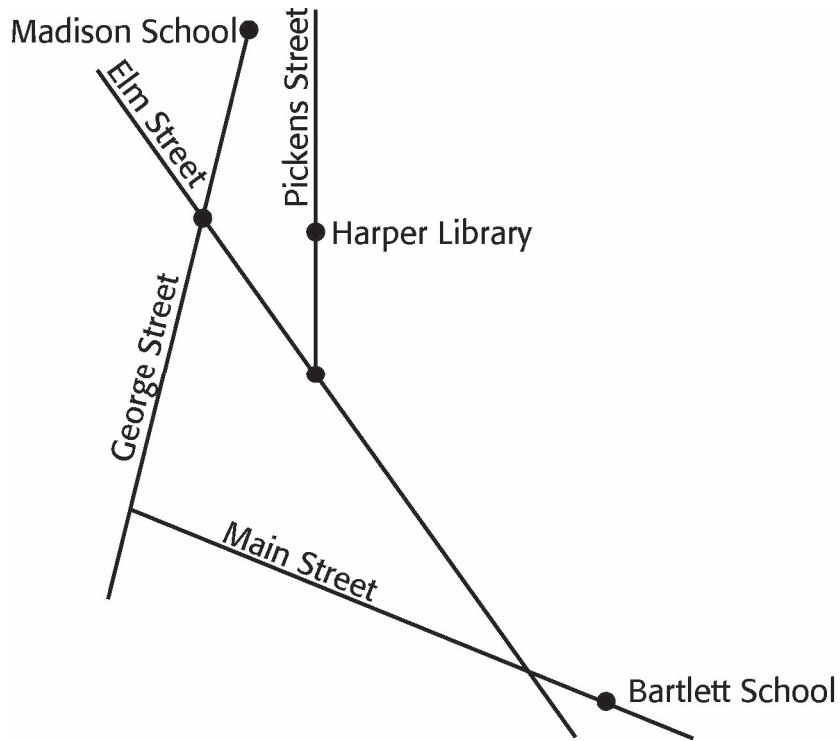
Using your inch ruler, what is the street distance, in miles, between Madison School and Harper Library?

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

81

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.

Answer Key

Content Standard 8

Sample Multiple-Choice

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

Sample Gridded

1. **4.5**
2. **8**

MEASUREMENT

Content Standard 9

Convert units of length, weight, or capacity within the same system (customary or metric).

Item Type

Multiple-choice

Additional Information

Converting from a larger unit to a smaller unit may be required.
Converting from a smaller unit to a larger unit may be required.
Word problems/real-life situations may be used.

Sample Multiple-Choice Items

1. Henry's fish tank has a capacity of 28 quarts of water.

   How many gallons of water would it take to fill Henry's fish tank to capacity?

   A 112 gallons   **C** 7 gallons *****

   B 28 gallons   **D** 4 gallons

3. A bottle holds 1 pint of liquid.

   Which of the following is equivalent to 1 pint?

   A 2 gallons   **C** 2 quarts

   B 2 fluid ounces   **D** 2 cups *****

2. A bridge has a weight limit of 16,000 pounds.

   What is the weight limit, in tons, of this bridge?

   A 8 tons *****   **C** 80 tons

   B 16 tons   **D** 160 tons

4. Savannah is 155 centimeters tall.

   Which of the following is equivalent to 155 centimeters?

   A 0.0155 m   **C** 1.55 m *

   B 0.155 m   **D** 15.5 m

5. 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   **C** 2.25 pounds

   B 3.375 pounds *   **D** 1.125 pounds

6. 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   **C** 0.049 kg *

   B 0.49 kg   **D** 0.0049 kg

7. 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   **C** $6\frac{1}{4}$ feet

   B $6\frac{1}{3}$ feet *   **D** $1\frac{1}{2}$ feet

8. The length of the earthworm that Timmy found in his backyard was 38 millimeters.

   Which is equivalent to 38 millimeters?

   A 0.038 cm   **C** 3.8 cm *

   B 0.38 cm   **D** 380 cm

9. 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   **C** 7,000 grams

   B 700 grams *   **D** 70,000 grams

10. 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 *

11. 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 2,304 pints

Answer Key

Content Standard 9

Sample Multiple-Choice

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

87

DATA ANALYSIS AND PROBABILITY

Content Standard 10

Interpret information from bar graphs, line graphs, and circle graphs.

Item Type

Multiple-choice
Gridded
Open-ended

Additional Information

Word problems/real-life situations may be used.
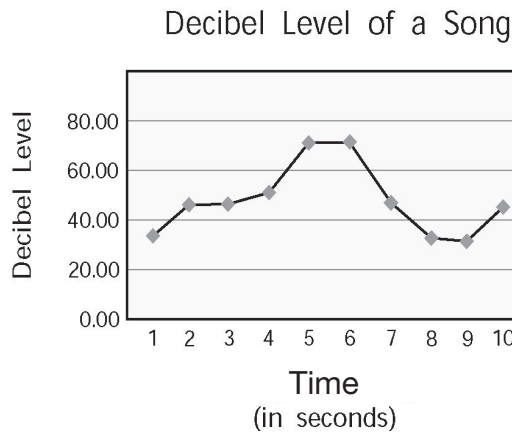Comparing types of graphs may be required.
Determining percents may be required.
Money values may be used.
In determining values in graphs, *closest* may be used.

Sample Multiple-Choice Items

1. The graph below displays the decibel level of a song after a specific
    number of seconds.

    Decibel Level of a Song

    Which of the following is *closest* to the difference in the decibel level of the
    song between the 2-second interval and the 6-second interval?

5	15	25	35
A	**B**	**C** *	**D**

88
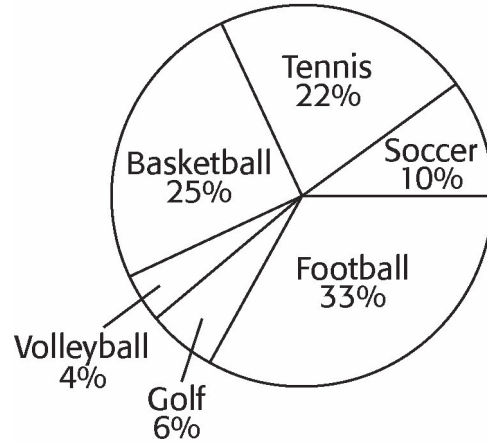
2. The graph shows the results of a survey about the favorite sport of a group of 300 students from Mr. Jahn's gym classes.

Favorite Sport Survey

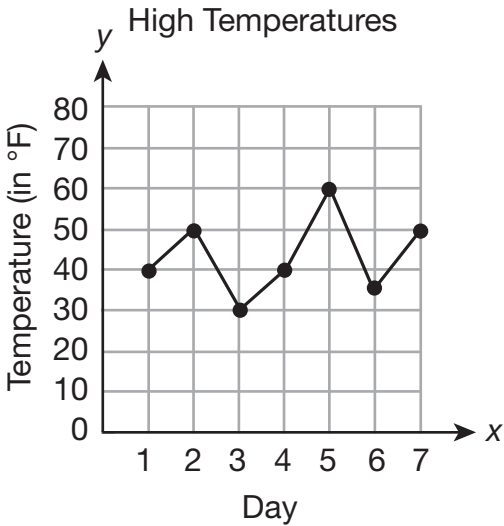What was the total number of students in the group who chose football as their favorite sport?

33	75	99	150
A	B	C*	D

89

3. Jenny recorded the high temperature each day for one week. She made the graph shown below.
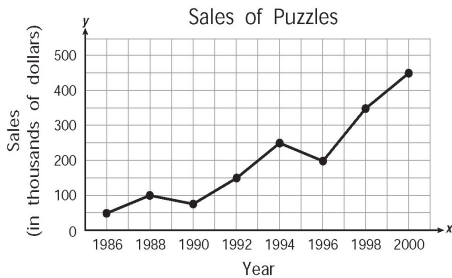
High Temperatures

Between which two days did the *greatest* change in temperature occur?

A Day 2 to Day 3

B Day 4 to Day 5

**C** Day 5 to Day 6 *

D Day 6 to Day 7

Sample Gridded Items

---

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

Sales of Puzzles

Sales (in thousands of dollars) vs *Year*

By how many dollars did the sales of puzzles increase from 1996 to 1998?
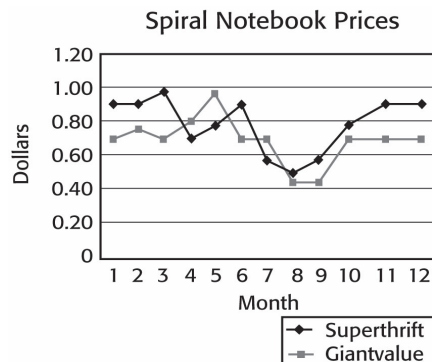
Mark your answer in the answer grid.

---

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

Flour to Make Muffins

Number of Muffins Made vs *Number of Cups of Flour*
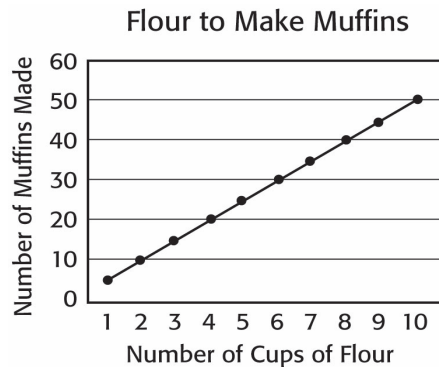
Based on this graph, what is the number of cups of flour needed to make 40 muffins?

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.

Spiral Notebook Prices

Dollars vs *Month*

Superthrift
Giantvalue

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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Sample Open-Ended Items

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

1. In the school newsletter there is an article about the number of female students who participate in sports at the school. The data display shown in the article shows that softball is twice as popular among the female students as basketball.

Female Students Participate in Sports
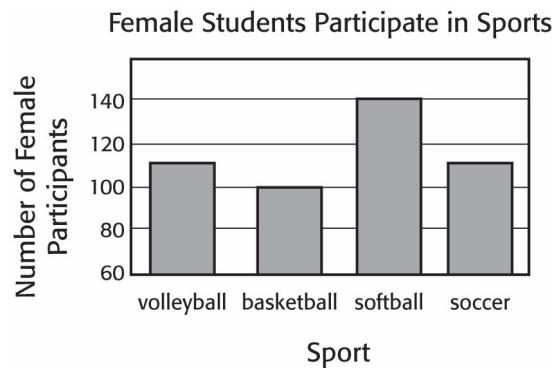
a. Would you accept this data display and interpretation? Why or why not?

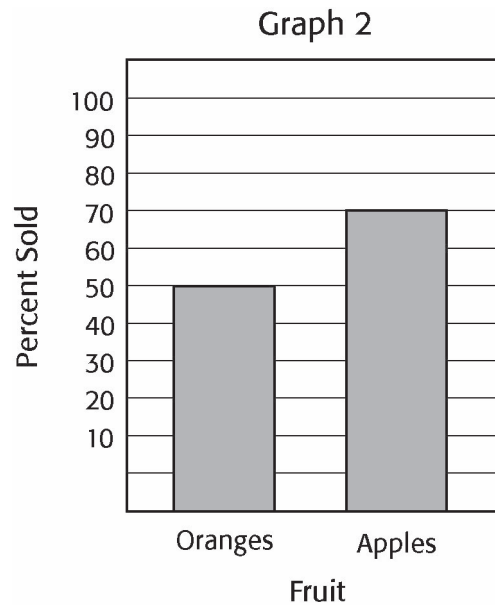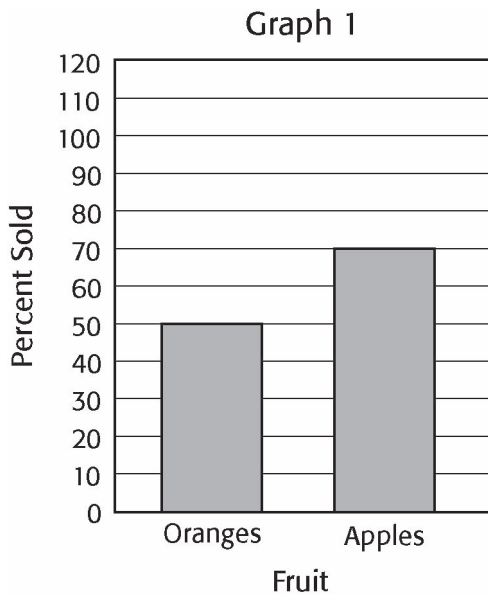b. Draw a graph that would accompany the article. Explain why you chose this graph.

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

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

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.
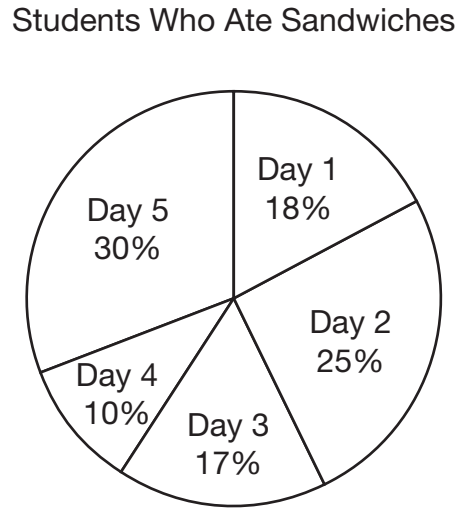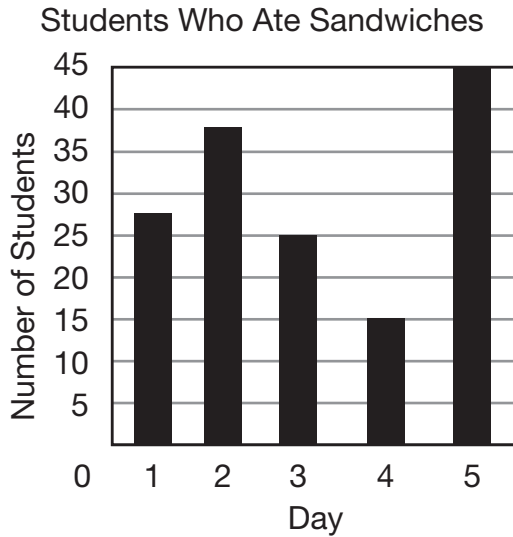

Graph 1

Graph 2

a. Does one bar graph more accurately present the data than the other bar graph?

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 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 all your work or explain all your reasoning. You may use drawings, words, or numbers in your answer. Your answer should be written so that another person could read it and understand your reasoning.

3. Mr. Hansen recorded the number of students who ate sandwiches at lunch each day for 5 days. He used the data to create the 2 graphs shown below.

Students Who Ate Sandwiches

Students Who Ate Sandwiches

   a. What is the *closest* estimate of the total number of students who ate sandwiches?

   b. How many more students ate sandwiches on day 3 than on day 4?

   c. Explain why it is easier to use the bar graph than the circle graph to find how many more students ate sandwiches on day 5 than on day 3.

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

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

4. The circle graph below shows the favorite colors of students in Mr. Hendrick's class. Each student chose only one color.

Favorite Colors
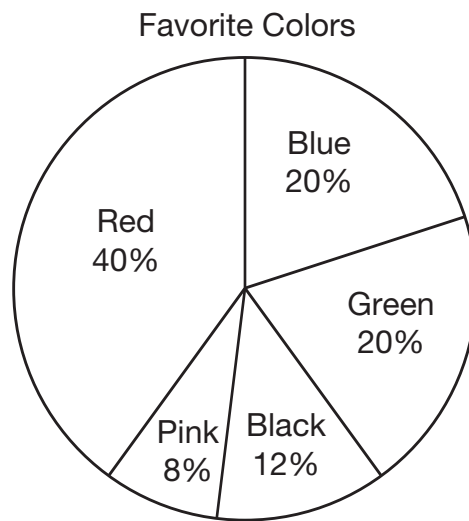
a. Which color was chosen by *fewer* students than those who chose blue but by *more* students than those who chose pink?

b. David said that 16 students chose red. Explain why this *may* be true.

c. Give one reason why the circle graph is a better way to represent the data than a line graph.

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

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

5. Dora recorded the number of hours she worked each month in the bar graph shown below.

Dora's Hours Worked
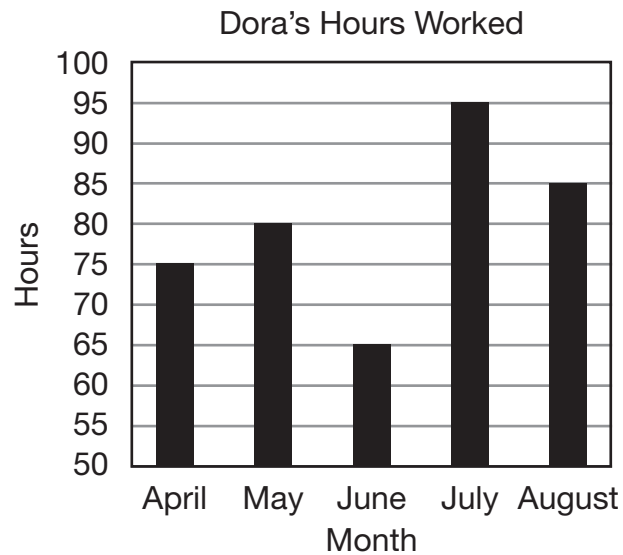
a. Which month did Dora work the *greatest* number of hours?

b. How many total hours did Dora work in the five months?

c. Based on the graph, Dora said she worked three times as many hours in July as she worked in June. Explain why Dora is *not* correct.

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

Answer Key

Content Standard 10

Sample Multiple-Choice

1. **C**
2. **C**
3. **C**

Sample Gridded

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

DATA ANALYSIS AND PROBABILITY

Content Standard 11

Find the probability of a simple event.

Item Type

Multiple-choice
Gridded

Additional Information

Expressing probability as a fraction, decimal, or percent may be required.
Tables may be used.
Word problems/real-life situations may be used.
Diagrams may be included.

Sample Multiple-Choice Items

1. There are 9 yellow tiles,
   6 green tiles, 6 blue tiles, and
   3 red tiles in a box. All the tiles
   in the box are identical in size
   and shape.

   What is the probability that
   the first tile picked at random
   from the box will be red?

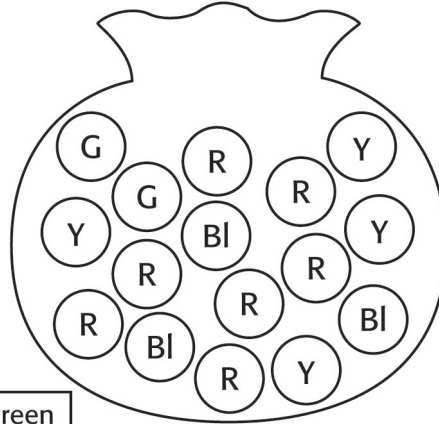| 12.5%	25.0%	37.5%	50.0%
A *	B	C	D

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

Adrian's Bag of Marbles

G = Green
Bl = Black
Y = Yellow
R = Red

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**

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?

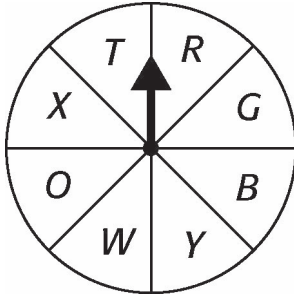 | $\dfrac{1}{12}$ | $\dfrac{6}{12}$ | $\dfrac{7}{12}$ | $\dfrac{8}{12}$ |
   |:---:|:---:|:---:|:---:|
   | **A** * | **B** | **C** | **D** |

5. A game has 9 red cards, 4 blue cards, and 7 gold cards. A card is picked at random.

   What is the probability that the card picked is a blue card?

0.02	0.04	0.2	0.4
A	**B**	**C** *	**D**

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Sample Gridded Items

1. The spinner below is divided into 8 equal sections. Whitney spun the arrow on the spinner once.

   If Whitney spins the arrow once, what is the probability that the spinner will *not* land on *T*?

   Express your answer as a decimal.

   Mark your answer in the answer grid.

2. Maryanne painted some identical-sized wooden blocks. She painted 6 green wooden blocks, 5 red wooden blocks, 4 blue wooden blocks, and 5 yellow wooden blocks and placed them in an empty bag.

   If Maryanne then selects a wooden block from the bag without looking, what is the probability that it will be one that was painted red?

   Express your answer as a decimal.

   Mark your answer in the answer grid.

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3. A citywide youth event had participants from four neighborhoods. There were 250 participants from Oak Bluff, 310 participants from Gordon Grove, 280 participants from Riverside, and 160 participants from Webster Heights.

   If a participant is chosen at random to win a prize, what is the probability that the participant will be from Gordon Grove?

   Express your answer as a decimal.

   Mark your answer in the answer grid.

5. Angela put colored paperclips into her empty pocket. She put 13 pink, 4 red, 1 yellow, and 2 green paperclips into her pocket. All of the paperclips are the same size and shape.

   If Angela reaches into her pocket containing these colored paperclips and selects a paperclip, what is the probability it will be a green or yellow paperclip?

   Express your answer as a decimal.

   Mark your answer in the answer grid.

4. Brendan has 40 individual socks in his drawer. Of all the socks, 26 are dark blue.

   If Brendan opens the drawer and selects one sock without looking, what is the probability that he will select a sock that is *not* dark blue?

   Express your answer as a decimal.

   Mark your answer in the answer grid.

6. Mrs. Tapper selected a helper for science class by writing each of the students' names on a piece of paper and selecting one at random. There were 13 boys and 15 girls in the class.

   What is the probability that a boy was selected?

   Express your answer as a fraction.

   Mark your answer in the answer grid.

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Answer Key

Content Standard 11

Sample Multiple-Choice

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

Sample Gridded

1. **0.875**
2. **0.25**
3. **0.31**
4. **0.35**
5. **0.15**
6. **13/28**

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