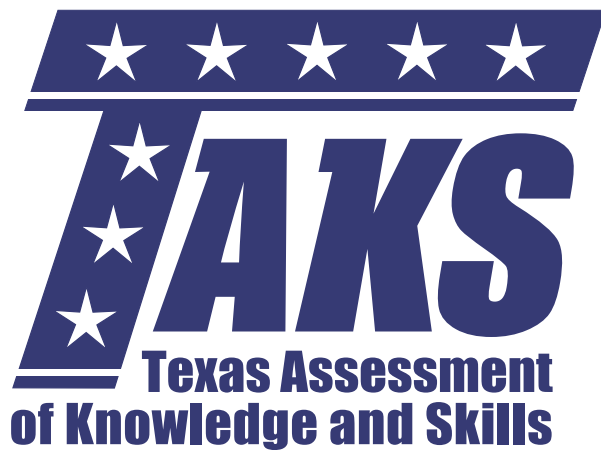


STUDENT NAME \_\_\_\_\_



**GRADE 8  
MATHEMATICS**

**Administered April 2009**



# MATHEMATICS



# Mathematics Chart

## LENGTH

### Metric

1 kilometer = 1000 meters  
 1 meter = 100 centimeters  
 1 centimeter = 10 millimeters

### Customary

1 mile = 1760 yards  
 1 mile = 5280 feet  
 1 yard = 3 feet  
 1 foot = 12 inches

## CAPACITY AND VOLUME

### Metric

1 liter = 1000 milliliters

### Customary

1 gallon = 4 quarts  
 1 gallon = 128 fluid ounces  
 1 quart = 2 pints  
 1 pint = 2 cups  
 1 cup = 8 fluid ounces

## MASS AND WEIGHT

### Metric

1 kilogram = 1000 grams  
 1 gram = 1000 milligrams

### Customary

1 ton = 2000 pounds  
 1 pound = 16 ounces

## TIME

1 year = 365 days  
 1 year = 12 months  
 1 year = 52 weeks  
 1 week = 7 days  
 1 day = 24 hours  
 1 hour = 60 minutes  
 1 minute = 60 seconds

Metric and customary rulers can be found on the separate Mathematics Chart.

# Mathematics Chart

<b>Perimeter</b>	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
<b>Circumference</b>	circle	$C = 2\pi r$ or $C = \pi d$
<b>Area</b>	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
<b>P</b> represents the Perimeter of the Base of a three-dimensional figure.		
<b>B</b> represents the Area of the Base of a three-dimensional figure.		
<b>Surface Area</b>	cube (total)	$S = 6s^2$
	prism (lateral)	$S = Ph$
	prism (total)	$S = Ph + 2B$
	pyramid (lateral)	$S = \frac{1}{2}Pl$
	pyramid (total)	$S = \frac{1}{2}Pl + B$
	cylinder (lateral)	$S = 2\pi rh$
	cylinder (total)	$S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$
<b>Volume</b>	prism	$V = Bh$
	cylinder	$V = Bh$
	pyramid	$V = \frac{1}{3}Bh$
	cone	$V = \frac{1}{3}Bh$
	sphere	$V = \frac{4}{3}\pi r^3$
<b>Pi</b>	$\pi$	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$
<b>Pythagorean Theorem</b>		$a^2 + b^2 = c^2$
<b>Simple Interest Formula</b>		$I = prt$

## DIRECTIONS

Read each question. Then fill in the correct answer on your answer document. If a correct answer is not here, mark the letter for “Not here.”

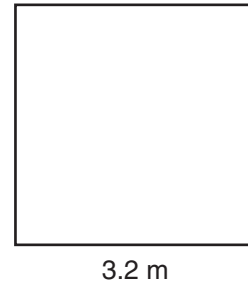
### SAMPLE A

Find the greatest common factor of 12 and 18.

- A 3
- B 6
- C 9
- D Not here

### SAMPLE B

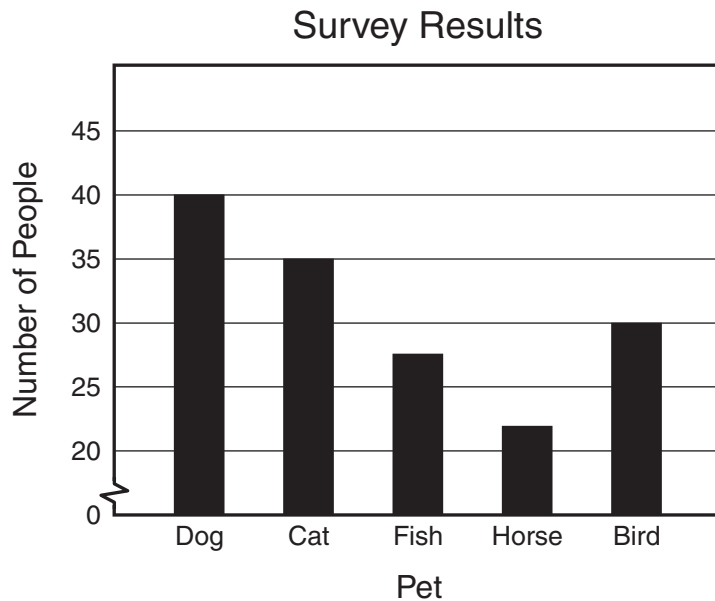
Find the perimeter of this square rug in meters.



Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.



- 1 The graph below shows the results of a survey about the animal that people prefer as a pet.

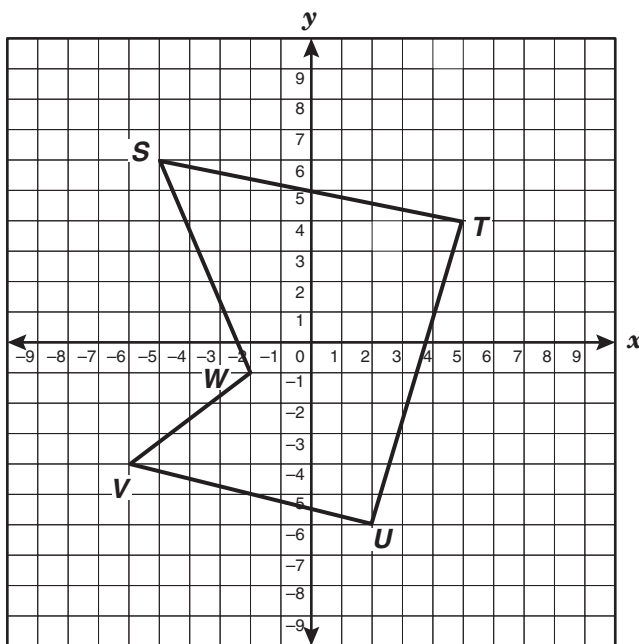


According to this graph, which statement is true?

- A** Twice as many people prefer dogs to fish.
- B** Most people do not prefer horses as pets because they are too big to care for.
- C** Many people prefer fish as pets because they are easy to care for.
- D** Five more people prefer cats to birds.
- 
- 2 Tomás will earn \$45 for each mile he walks in a charity walkathon. Tomás walks between 8 and 12 miles during the walkathon. Which of the following is a possible amount he will earn for the charity?
- F** \$405
- G** \$315
- H** \$630
- J** \$900
- 3 Marta is twice as old as Jamie, and Angie is one-fourth the age of Kelly. Kelly is 8 years older than Marta. Jamie is 20 years old. Who is the youngest?
- A** Marta
- B** Jamie
- C** Angie
- D** Kelly



- 4 Figure  $STUVW$  will be translated 5 units left and 7 units up to form figure  $S'T'U'V'W'$ .



Which ordered pair best represents point  $W'$ ?

- F** (3, 6)
- G** (-2, 1)
- H** (-7, 6)
- J** (2, -1)

- 5 A mistake was made in simplifying the expression below.

Simplify:  $5 + 2(6 + 4) - 2^3$

Step 1:  $5 + 2(10) - 2^3$

Step 2:  $7(10) - 2^3$

Step 3:  $70 - 2^3$

Step 4:  $70 - 8$

Step 5: 62

In which step did the mistake first appear?

- A** Step 1
- B** Step 2
- C** Step 3
- D** Step 4

- 6 A truck driver travels at an average speed of 53 miles per hour. Which equation can be used to find  $d$ , the distance the truck driver will travel in  $3\frac{1}{2}$  hours?

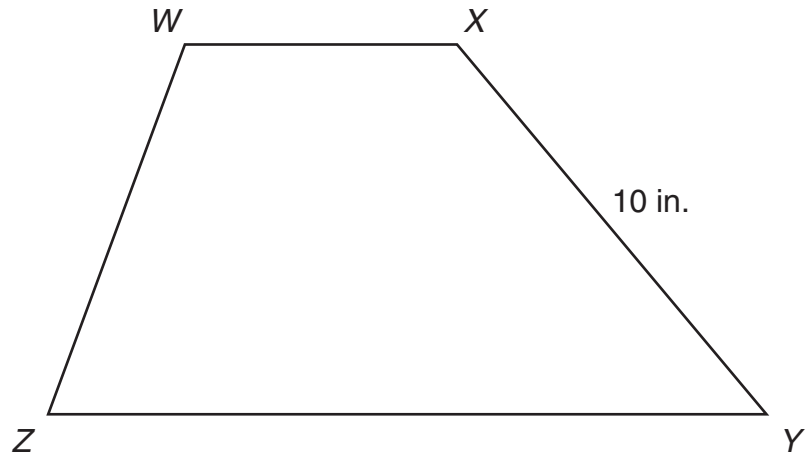
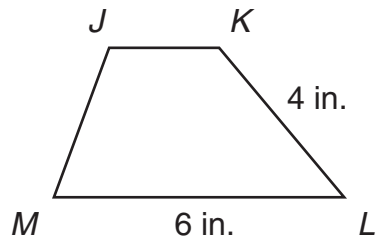
**F**  $d = 53 \cdot 3\frac{1}{2}$

**G**  $d = 53 \div 3\frac{1}{2}$

**H**  $d = 3\frac{1}{2} \div 53$

**J**  $d = 3\frac{1}{2} + 53$

- 7 Trapezoid  $JKLM$  is similar to trapezoid  $WXYZ$ .



What is the length of  $\overline{YZ}$ ?

- A  $6\frac{2}{3}$  in.
- B 12 in.
- C  $10\frac{2}{3}$  in.
- D 15 in.

- 8 The table below shows the value of the first five terms in a sequence.

Position	Value of Term
1	13
2	8
3	3
4	-2
5	-7
$n$	?

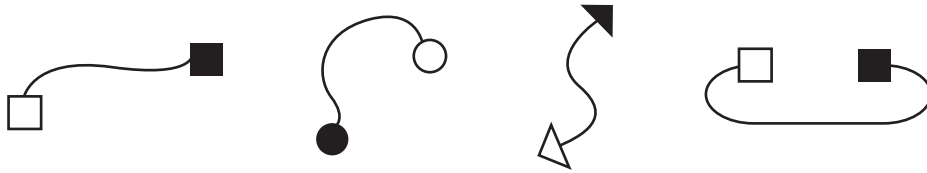
Which expression can be used to find the value of the  $n$ th term?

- F**  $5n - 2$   
**G**  $23 - 6n$   
**H**  $15 - 2n$   
**J**  $18 - 5n$

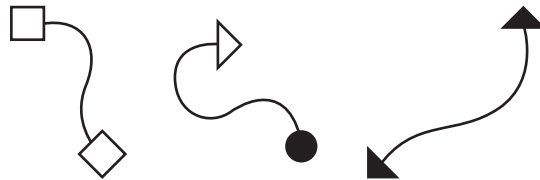
- 9 A store manager collects data showing the number of times each brand of soap is purchased in his store. Which measure of data shows which brand he sells most?

- A** Range  
**B** Mean  
**C** Mode  
**D** Median

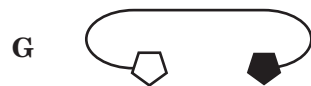
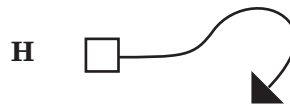
10 The following figures are in Set R.



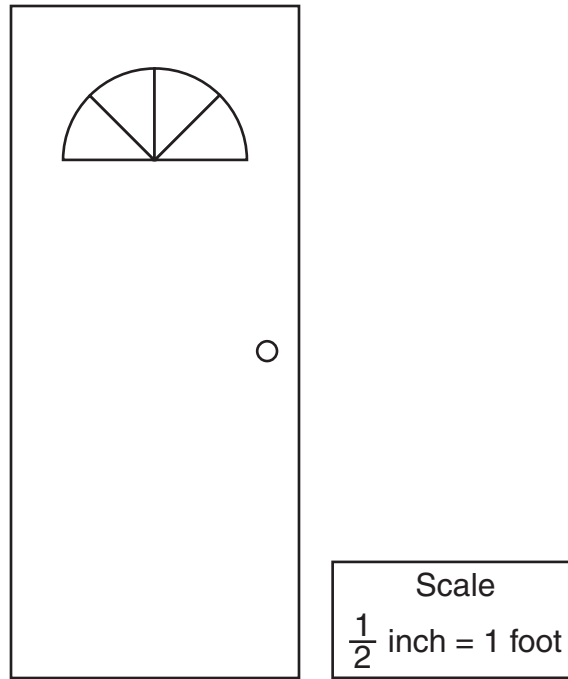
The following figures are not in Set R.



Which of the following figures belongs in Set R?



- 11 The scale drawing below shows a door. Use the ruler on the Mathematics Chart to measure the dimensions of this door to the nearest  $\frac{1}{2}$  inch.



Which of the following dimensions are closest to those of the actual door?

- A  $2\frac{1}{2}$  feet wide and  $6\frac{1}{2}$  feet high
- B  $2\frac{1}{2}$  feet wide and 7 feet high
- C 3 feet wide and  $6\frac{1}{2}$  feet high
- D 3 feet wide and 7 feet high
- 
- 12 Which of the following numbers is greater than  $-1.075$ ?
- F  $-2.03$
- G  $-1.90$
- H  $-1.06$
- J  $-1.26$

- 13** The table below shows monthly water rates for using  $g$  gallons of water.

Monthly Water Rates

Water Used (gallons)	Total Cost (dollars)
First 8,000	7
8,001 to 13,000	$7 + 0.0012(g - 8,000)$
13,001 to 18,000	$13 + 0.002(g - 13,000)$
More than 18,000	$23 + 0.0032(g - 18,000)$

What is the total cost for a business that uses 10,000 gallons in one month?

- A** \$7.00
- B** \$9.40
- C** \$17.00
- D** \$29.40

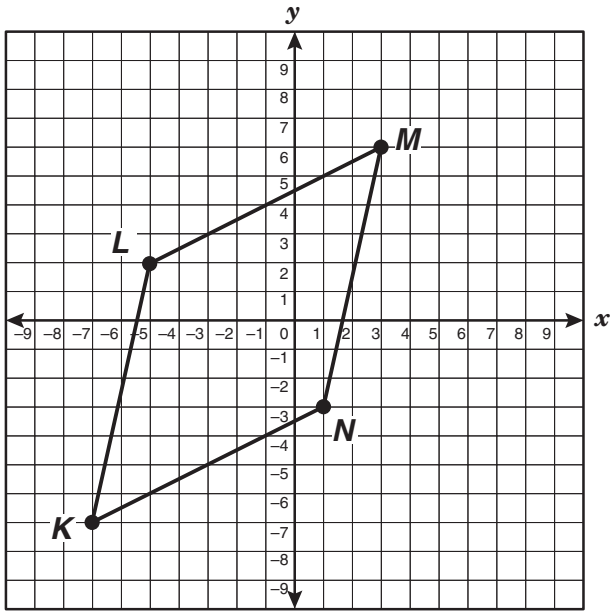
- 14** The probability of getting a red gumball from a gumball machine is  $\frac{1}{8}$ . The probability of getting a red piece of candy from a candy machine is  $\frac{1}{6}$ . If both a gumball and a piece of candy are purchased, what is the probability that both are red?

- F**  $\frac{1}{48}$
- G**  $\frac{1}{7}$
- H**  $\frac{7}{24}$
- J**  $\frac{1}{14}$

- 15** Gabby can assemble 7 music books in 4 minutes. At this rate, how many music books can she assemble in 2 hours?

- A** 14
- B** 105
- C** 69
- D** 210

- 16 Parallelogram  $KLMN$  has vertices  $K(-7, -7)$ ,  $L(-5, 2)$ ,  $M(3, 6)$ , and  $N(1, -3)$ .



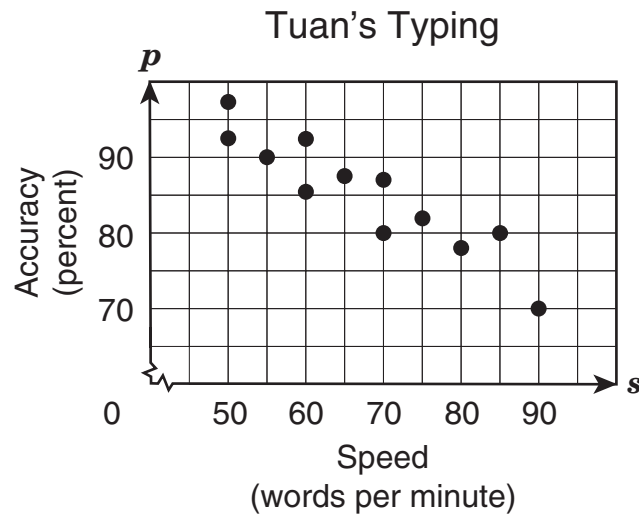
Which of the following are coordinates of a point inside parallelogram  $KLMN$ ?

- F  $(3\frac{1}{4}, 1\frac{1}{2})$   
G  $(-3\frac{3}{4}, 1\frac{1}{4})$   
H  $(-1\frac{3}{4}, -5\frac{1}{2})$   
J  $(\frac{1}{4}, -4\frac{1}{4})$

- 17 Jasmine is building birdhouses. It takes her  $3\frac{1}{2}$  hours to build 4 birdhouses. Which of the following is an equivalent rate?

- A 14 hours to build 18 birdhouses  
B 28 hours to build 35 birdhouses  
C 7 hours to build 8 birdhouses  
D 21 hours to build 28 birdhouses

- 18 Tuan made the scatterplot below to show the relationship between his typing accuracy and his typing speed.



Which statement best describes the relationship shown in this scatterplot?

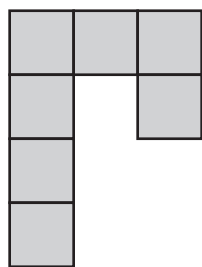
- F There is no relationship between Tuan's typing speed and his typing accuracy.
- G As Tuan's typing speed increased, his accuracy remained constant.
- H As Tuan's typing speed increased, his accuracy increased.
- J As Tuan's typing speed increased, his accuracy decreased.

- 19 Marcos buys 15 folders that cost \$0.75 each and 6 pens that cost \$1.25 each. What is the total cost in dollars and cents of the folders and pens, not including tax?

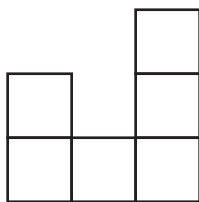
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.



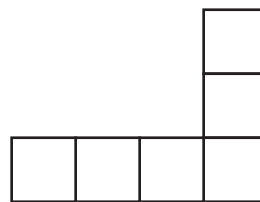
- 20** The drawings below show the top, front, and right-side views of a 3-dimensional figure built using identical cubes.



Top view

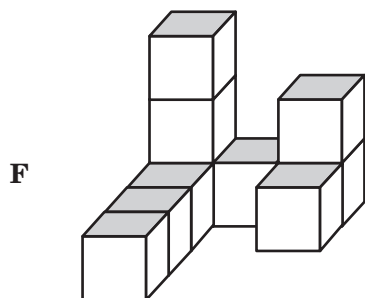


Front view

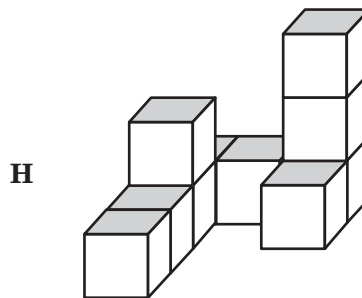


Right-side view

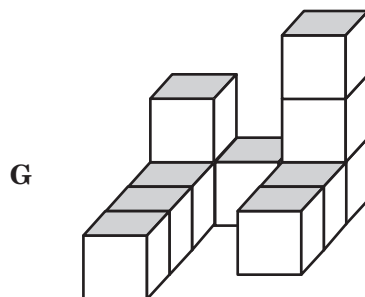
Which 3-dimensional figure do these views best represent?



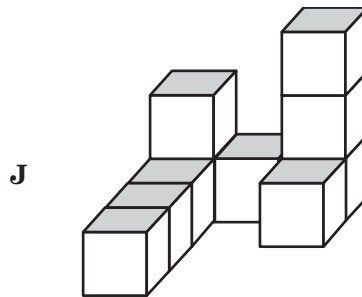
Front



Front

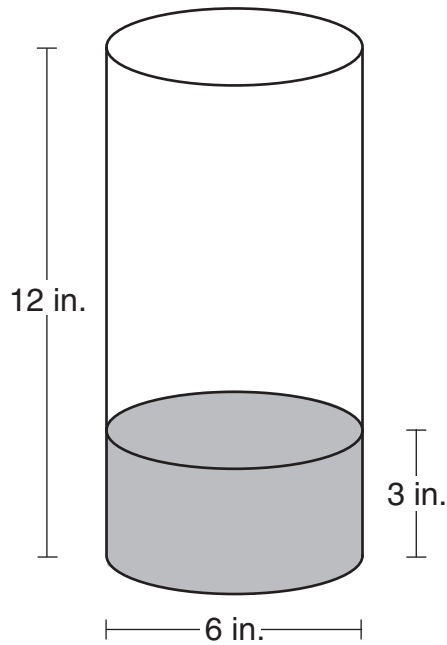


Front



Front

- 21** A cylindrical glass vase is 6 inches in diameter and 12 inches high. There are 3 inches of sand in the vase, as shown below.



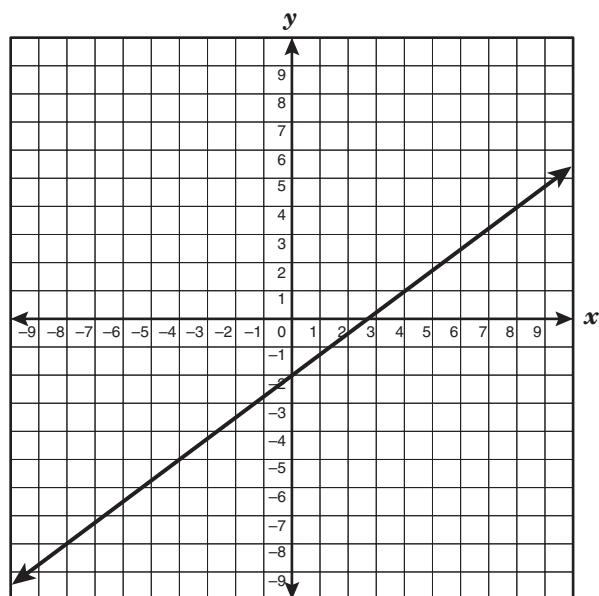
Which of the following is closest to the volume of the sand in the vase?

- A** 85 in.<sup>3</sup>
- B** 254 in.<sup>3</sup>
- C** 54 in.<sup>3</sup>
- D** 339 in.<sup>3</sup>

- 22** A human red blood cell is about 0.000008 meter in diameter. Which of the following represents this number in scientific notation?

- F**  $0.8 \times 10^{-6}$
- G**  $8.0 \times 10^{-6}$
- H**  $0.8 \times 10^6$
- J**  $8.0 \times 10^6$

- 23 The graph of the equation  $y = \frac{3}{4}x - 2$  is shown below.



Which table of values best represents ordered pairs on the graphed equation?

A

$x$	$y$
-8	-8
0	-2
4	-1

C

$x$	$y$
0	-2
1	4
8	4

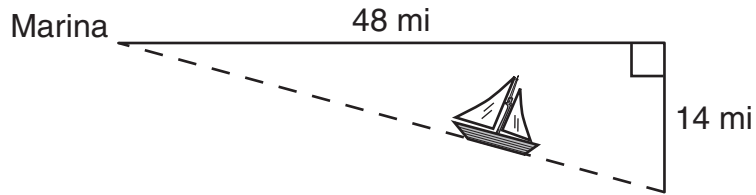
B

$x$	$y$
-4	-5
4	1
8	5

D

$x$	$y$
-4	-5
0	-2
4	1

- 24** Tai sailed east from the marina for 48 miles and then sailed south for 14 miles, as shown in the diagram.



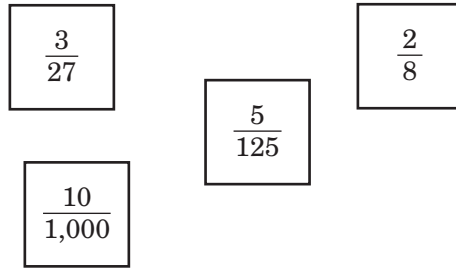
What is the shortest distance Tai can sail to return to the marina?

- F** 62 mi
- G** 82 mi
- H** 50 mi
- J** 34 mi

- 
- 25** In July 2005 the United States imported approximately 10.3 million barrels of oil per day. Canada supplied about 16% of the imported oil. Which of these is closest to the number of barrels of oil the United States imported from Canada each day?

- A** 5.7 million
- B** 1.6 million
- C** 2.1 million
- D** 0.2 million

- 26** A set of tiles is shown below.



Which statement best describes the relationship between the numerators and denominators of these fractions?

- F** The denominator is the square of the numerator.
- G** The denominator is twice the numerator.
- H** The denominator is the cube of the numerator.
- J** The denominator is three times the numerator.

- 27** As part of a science experiment, four students each planted some flower seeds. After one week the students compared the number of seeds that germinated with the number of seeds planted. Their results are shown in the table below.

Science Experiment

Student	Result
Nadia	0.75
Eduardo	60%
Kim	$\frac{4}{5}$
Jordan	$\frac{2}{3}$

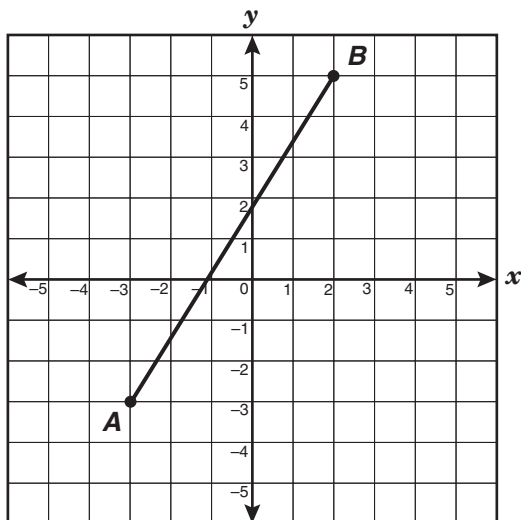
Which list shows the results in order from least to greatest?

- A** 60%,  $\frac{2}{3}$ , 0.75,  $\frac{4}{5}$
- B** 60%, 0.75,  $\frac{2}{3}$ ,  $\frac{4}{5}$
- C**  $\frac{4}{5}$ , 0.75,  $\frac{2}{3}$ , 60%
- D**  $\frac{2}{3}$ ,  $\frac{4}{5}$ , 60%, 0.75

- 28** Which statement best describes the change in the perimeter of a triangle if all its side lengths are multiplied by 4?

- F** The new perimeter will be 12 times as large as the perimeter of the original triangle.
- G** The new perimeter will be 16 times as large as the perimeter of the original triangle.
- H** The new perimeter will be 4 times as large as the perimeter of the original triangle.
- J** The new perimeter will be 8 times as large as the perimeter of the original triangle.

- 29 If  $AB = \sqrt{89}$ , the length of  $\overline{AB}$  is —



- A between 43 units and 45 units
- B between 88 units and 90 units
- C between 8 units and 9 units
- D between 9 units and 10 units

- 30 The expression shown below describes a sequence of numbers.

$$2n + 3$$

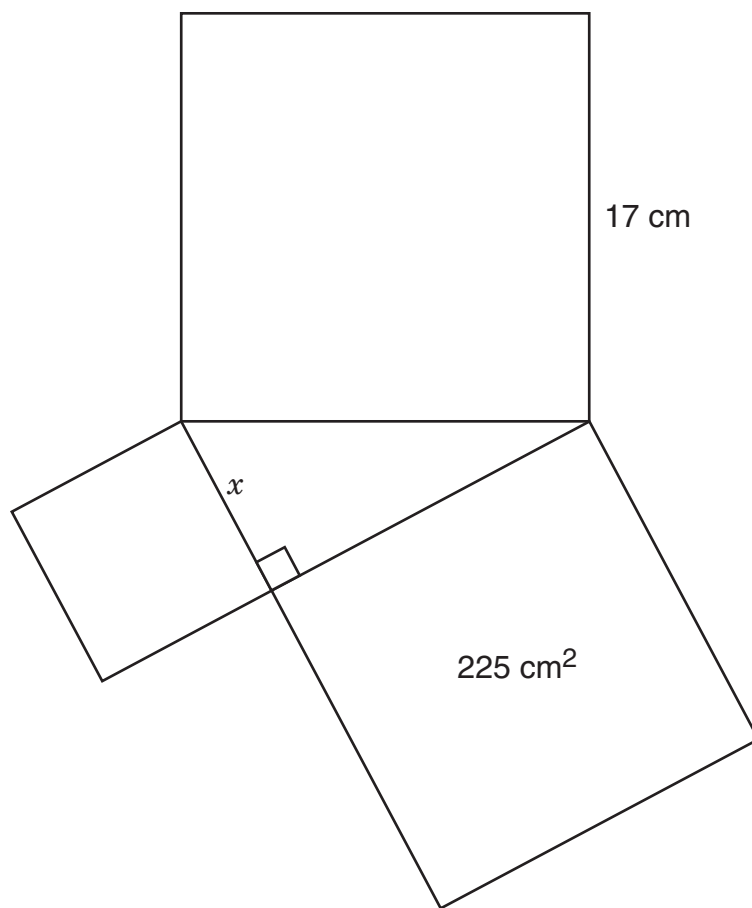
If  $n$  represents the position of a number in this sequence, which sequence of numbers does this expression describe?

- F 5, 8, 11, 14, 17, ...
- G 5, 7, 9, 11, 13, ...
- H 2, 3, 5, 8, 13, 21, ...
- J 2, 5, 8, 11, 14, ...

- 31 Jodie wants to buy a shirt regularly priced at \$20. The shirt is on sale for 15% off the regular price. Which equation can be used to determine  $s$ , the sale price of the shirt, not including tax?

- A  $s = 20 - (20)(0.15)$
- B  $s = 20 - (20 + 0.15)$
- C  $s = 20(0.15)$
- D  $s = 20 + 0.15$

- 32** The right triangle shown below is formed by joining three squares at their vertices.



What is the value of  $x$ , the side length of the smallest square?

- F** 16 cm
- G** 8 cm
- H** 2 cm
- J** 32 cm



- 33** Mr. Reyna spent the afternoon bird-watching at the coast. The table below shows the number of each type of bird he saw.

Coastal Birds

Bird Type	Number of Birds
Great blue heron	2
Roseate spoonbill	80
Brown pelican	40
Herring gull	128

Based on the information in the table, which of these is NOT a valid conclusion?

- A** Mr. Reyna saw twice as many roseate spoonbills as brown pelicans.
- B** Of the birds Mr. Reyna saw, 2% were great blue herons.
- C** Mr. Reyna saw 20 times as many brown pelicans as great blue herons.
- D** More than half the birds Mr. Reyna saw were herring gulls.

- 34** Mrs. Jackson bought 8 pounds of potatoes for \$3.92. Which of the following represents the same price per pound?

- F** 10 pounds of potatoes for \$4.70
- G** 25 pounds of potatoes for \$11.25
- H** 5 pounds of potatoes for \$2.45
- J** 20 pounds of potatoes for \$9.60

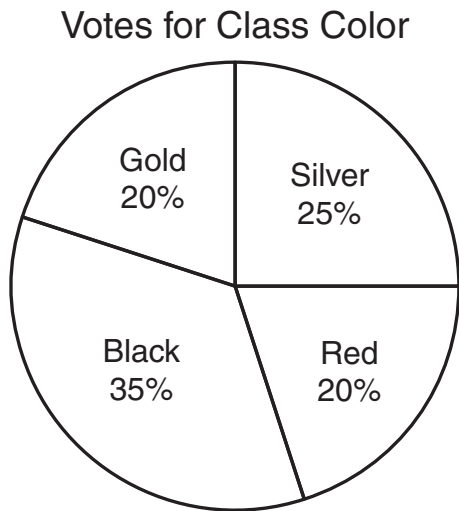
- 35** The cost of renting video games at two different video stores is listed below.

- Best Videos: \$2 per video game plus a \$30 membership fee
- Quality Videos: \$5 per video game and no membership fee

For what number of video games is the cost of renting from either store the same?

- A** 10
- B** 12
- C** 6
- D** 15

36 There were 200 students who voted for a class color. The results are shown in the graph below.



Based on the information in the graph, which table represents the actual number of votes for each color?

Votes for Class Color

	Color	Number of Votes
F	Silver	25
	Red	20
	Black	35
	Gold	20

Votes for Class Color

	Color	Number of Votes
H	Silver	40
	Red	50
	Black	60
	Gold	50

Votes for Class Color

	Color	Number of Votes
G	Silver	90
	Red	72
	Black	126
	Gold	72

Votes for Class Color

	Color	Number of Votes
J	Silver	50
	Red	40
	Black	70
	Gold	40

- 37** Alyssa rakes leaves for her neighbors. She charges \$4.00 per hour to rake leaves plus \$7.00 to remove the leaves. She uses the equation below to calculate  $t$ , her total earnings based on  $h$ , the number of hours she works.

$$t = 7 + 4h$$

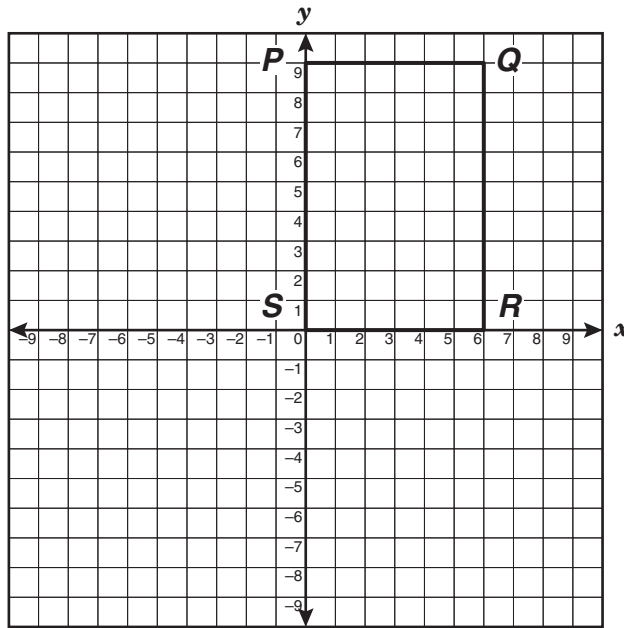
How much will Alyssa earn if she works for 3 hours 15 minutes?

- A** \$23.00
- B** \$34.65
- C** \$20.00
- D** \$35.75

- 38** Mr. Reynolds wants to determine the number of bags of fertilizer he should buy in order to completely cover his yard. Which of the following methods can he use to find the number of bags of fertilizer he needs?

- F** Multiply the area of the yard by the area each bag of fertilizer can cover
- G** Divide the area of the yard by the area each bag of fertilizer can cover
- H** Multiply the area of the yard by the cost of each bag of fertilizer
- J** Divide the area of the yard by the weight of each bag of fertilizer

- 39 With the origin as the center of dilation, rectangle  $PQRS$  will be dilated by a scale factor of  $\frac{1}{3}$  to form rectangle  $P'Q'R'S'$ .



What will be the length of  $\overline{P'S'}$ ?

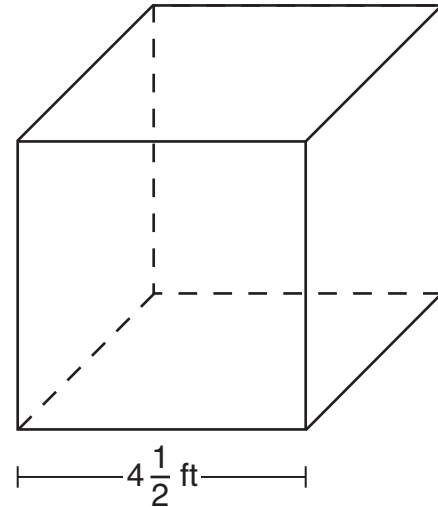
- A 3 units  
B 2 units  
C 27 units  
D 18 units
- 
- 40 Four people plan to drive an equal amount of time during a 16-hour car trip. The first driver accidentally drives 15% longer than he should have. If the other three people evenly divide the remaining driving time, how long will each of the three people drive?
- F 4.6 hours  
G 3.8 hours  
H 4 hours  
J 5 hours
- 41 The cars in a parade are passing Marisol at a rate of 2 cars per minute. If it takes 18 minutes for all the cars to pass by Marisol, which equation can she use to determine  $c$ , the number of cars in the parade?
- A  $c = \frac{18}{2}$   
B  $c = 18\left(\frac{60}{2}\right)$   
C  $c = 2\left(\frac{18}{60}\right)$   
D  $c = 2(18)$

- 42 Which equation best represents the relationship between  $x$  and  $y$  in the table below?

$x$	$y$
8	1
12	3
18	6
20	7

- F  $y = \frac{1}{2}x - 3$
- G  $y = \frac{1}{2}x - 6$
- H  $x = 2y - 6$
- J  $x = 2y - 3$
- 43 Tim recorded that 27 out of 63 customers used a shopping cart at a grocery store. Based on these results, about how many customers out of 350 can be expected to use a shopping cart?
- A 110
- B 260
- C 90
- D 150

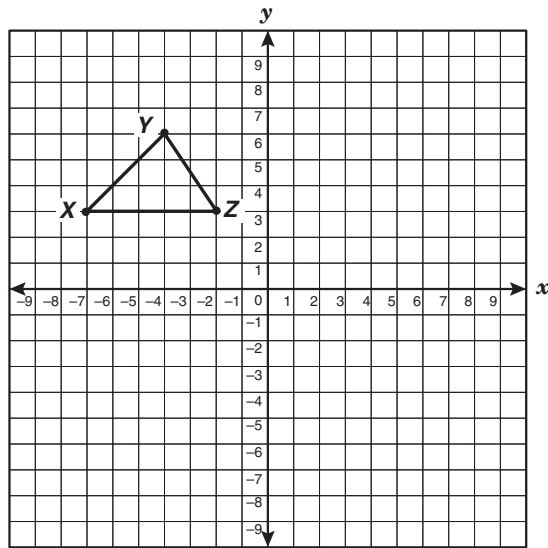
- 44 A cube is shown below.



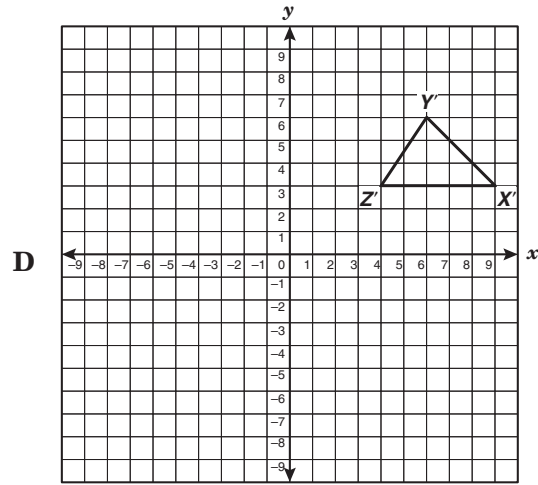
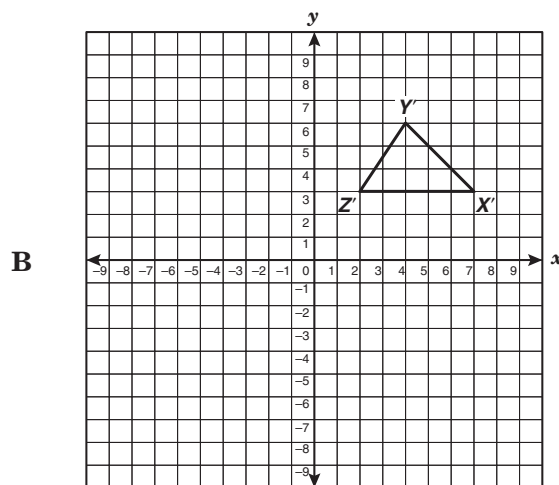
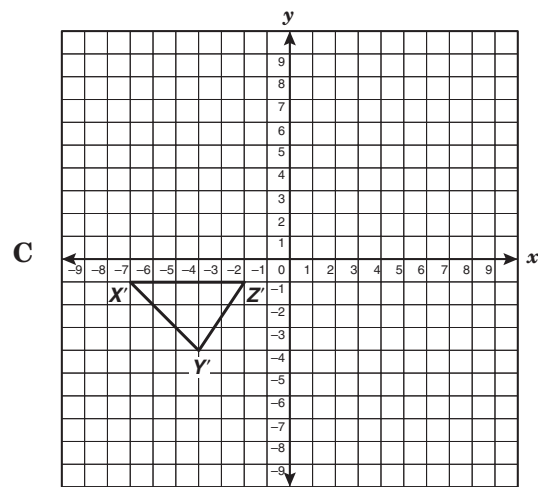
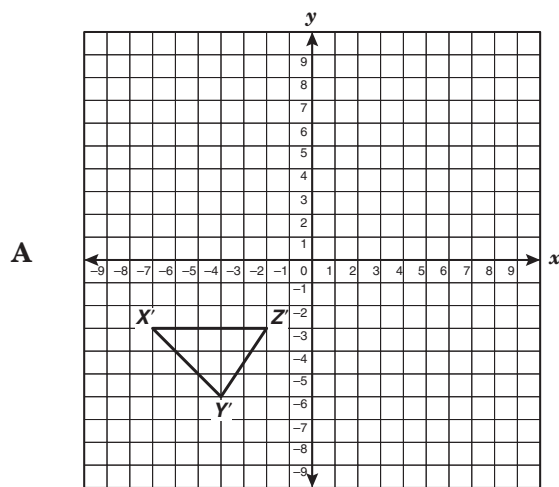
What is the total surface area of this cube?

- F  $91\frac{1}{8} \text{ ft}^2$
- G  $20\frac{1}{4} \text{ ft}^2$
- H  $121\frac{1}{2} \text{ ft}^2$
- J  $101\frac{1}{4} \text{ ft}^2$

- 45 The vertices of triangle  $XYZ$  are  $X(-7, 3)$ ,  $Y(-4, 6)$ , and  $Z(-2, 3)$ .



If triangle  $XYZ$  is reflected across the  $y$ -axis, which graph best represents triangle  $X'Y'Z'$ ?



- 46 One Saturday Haley asked all the people leaving a jogging trail whether they run on a regular basis. Of the 378 people she asked, 347 said yes. Haley concluded that nearly all the people in her city run on a regular basis. What is the best explanation of why her conclusion might NOT be valid?

**F** The sample size was not large enough.  
**G** Haley should have randomly selected people leaving the jogging trail.  
**H** Haley did not ask how long each person ran.  
**J** The sample may not have been representative of all the people in the city.

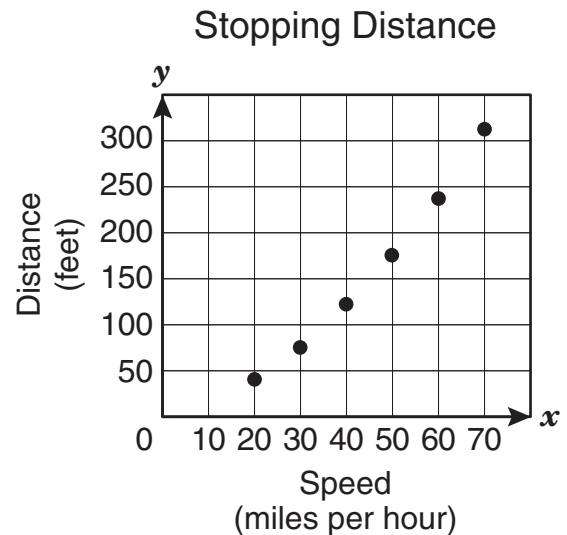
- 47 Louise wants to buy some socks. The packages of socks she could buy are listed below.

- 4 pairs of socks for \$12.64
- 6 pairs of socks for \$18.00

Louise concludes that the package containing 6 pairs of socks is a better price. Which statement best describes her conclusion?

**A** Louise is correct because the package of 6 pairs costs exactly \$0.16 less per pair.  
**B** Louise is incorrect because the package of 4 pairs costs exactly \$0.16 less per pair.  
**C** Louise is correct because the package of 6 pairs costs exactly \$0.08 less per pair.  
**D** Louise is incorrect because the package of 4 pairs costs exactly \$0.08 less per pair.

- 48 The graph below shows the stopping distance for a certain car, depending on the speed of the car when the brakes were applied.



If the car needed 210 feet to stop, approximately how fast was the car traveling?

**F** Between 40 and 50 miles per hour  
**G** Between 50 and 60 miles per hour  
**H** Between 60 and 70 miles per hour  
**J** Between 70 and 80 miles per hour

- 49 A cookie recipe requires 2 pounds of butter to make 18 dozen cookies. If a baker wants to make only 3 dozen cookies, which proportion can he use to find  $b$ , the number of pounds of butter he needs?

A  $\frac{2}{18} = \frac{b}{3}$

B  $\frac{5}{18} = \frac{b}{3}$

C  $\frac{2}{18} = \frac{3}{b}$

D  $\frac{3}{18} = \frac{2}{b}$

- 50 Frank plans to make a display by stacking cans. The top 3 rows are shown below.



The display will be a total of 7 rows high. How many cans in all will Frank need to make the display?

- F 49  
G 28  
H 7  
J 22

BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS  
ON THE ANSWER DOCUMENT.





