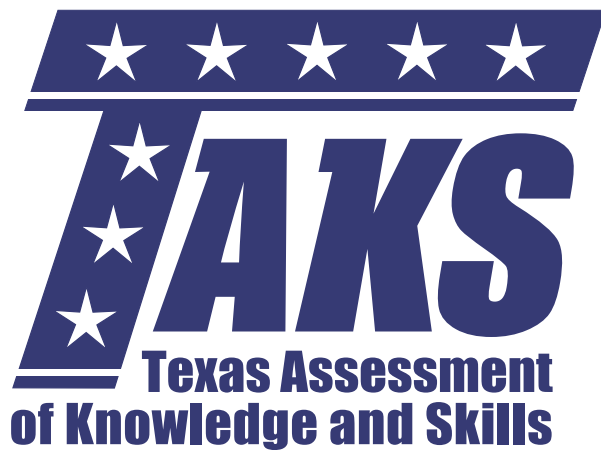


STUDENT NAME _____



**GRADE 10
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

Perimeter	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	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 $A = \frac{(b_1 + b_2)h}{2}$
	regular polygon	$A = \frac{1}{2}aP$
	circle	$A = \pi r^2$
<i>P</i> represents the Perimeter of the Base of a three-dimensional figure.		
<i>B</i> represents the Area of the Base of a three-dimensional figure.		
Surface Area	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 $S = 2\pi r(h + r)$
	cone (lateral)	$S = \pi rl$
	cone (total)	$S = \pi rl + \pi r^2$ or $S = \pi r(l + r)$
	sphere	$S = 4\pi r^2$
Volume	prism or cylinder	$V = Bh$
	pyramid or cone	$V = \frac{1}{3}Bh$
	sphere	$V = \frac{4}{3}\pi r^3$
Special Right Triangles	30°, 60°, 90°	$x, x\sqrt{3}, 2x$
	45°, 45°, 90°	$x, x, x\sqrt{2}$
Pythagorean Theorem		$a^2 + b^2 = c^2$
Distance Formula		$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Slope of a Line		$m = \frac{y_2 - y_1}{x_2 - x_1}$
Midpoint Formula		$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$
Quadratic Formula		$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Slope-Intercept Form of an Equation		$y = mx + b$
Point-Slope Form of an Equation		$y - y_1 = m(x - x_1)$
Standard Form of an Equation		$Ax + By = C$
Simple Interest Formula		$I = prt$

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 slope of the line $2y = 8x - 3$.

A $-\frac{3}{2}$

B 4

C 8

D Not here

SAMPLE B

Janice uses a rectangular box to store her art supplies. The dimensions of the rectangular box are 22.5 inches by 14 inches by 11.5 inches. What is the volume of this box in cubic inches?

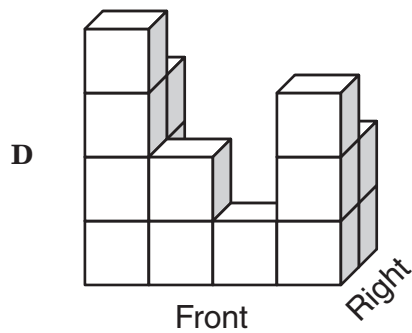
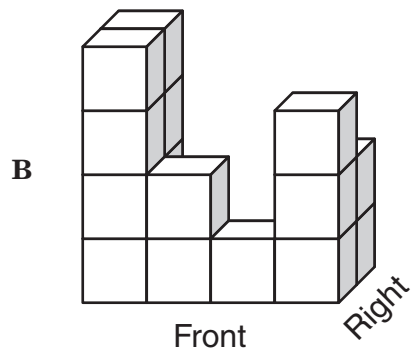
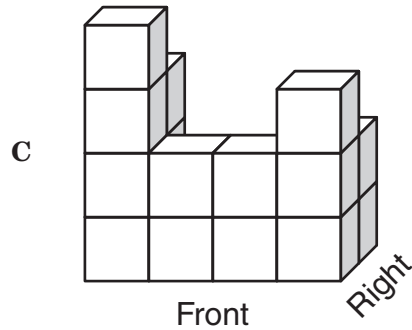
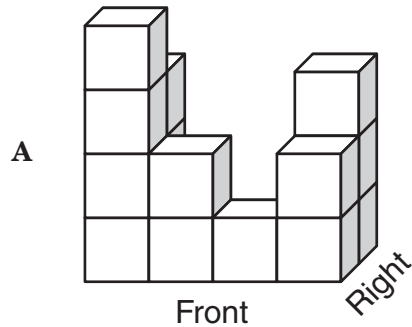
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.



- 1 The grid below shows the top view of a 3-dimensional structure built using identical cubes. The numbers represent how many cubes are in each column.

3			2	Right
4	2	1	3	
Front				

Which of the following best represents this structure?



- 2 Wesley works at a shoe store. He is paid \$8 an hour plus a 7% commission on his total sales. Which of the following best represents t , Wesley's total weekly earnings if he works 30 hours and has total sales of s dollars?

F $t = 0.08(30) + 0.07s$

G $t = 8(30) + 7s$

H $t = 8(30) + 0.07s$

J $t = 8(30) + 0.7s$

- 3 A toy company plans to make a model of a train engine using a scale where 1 inch represents 4 feet. If the length of the actual engine is 51 feet, which of these is closest to the length of the model in inches?

A $12\frac{3}{4}$ in.

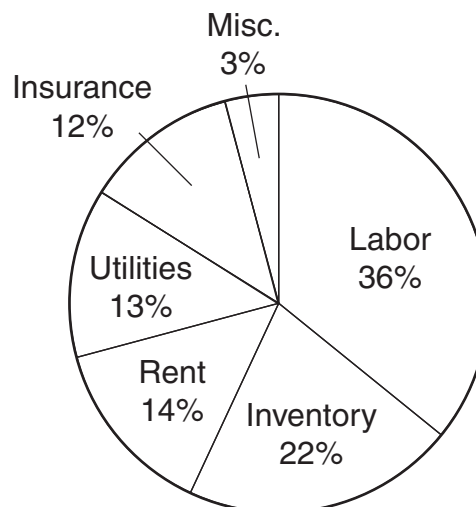
B 3 in.

C 204 in.

D $11\frac{1}{3}$ in.

- 4 Mr. Vincent owns a store that sells auto parts. He budgeted \$24,000 for the store's expenses last month. The graph below shows the percentage of the budget he reserved for each type of expense.

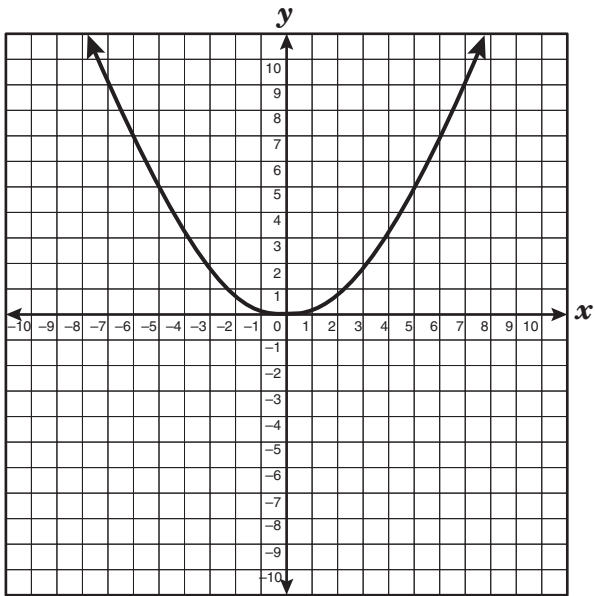
Mr. Vincent's Monthly Budget



Which statement is best supported by the data in the graph?

- F Mr. Vincent budgeted \$15,500 for labor, utilities, and rent.
- G More than 50% of Mr. Vincent's budget was reserved for rent and utilities.
- H Mr. Vincent budgeted \$16,800 for labor, insurance, and inventory.
- J Less than 50% of Mr. Vincent's budget was reserved for labor and inventory.

- 5 The graph of $y = 0.2x^2$ is shown below.



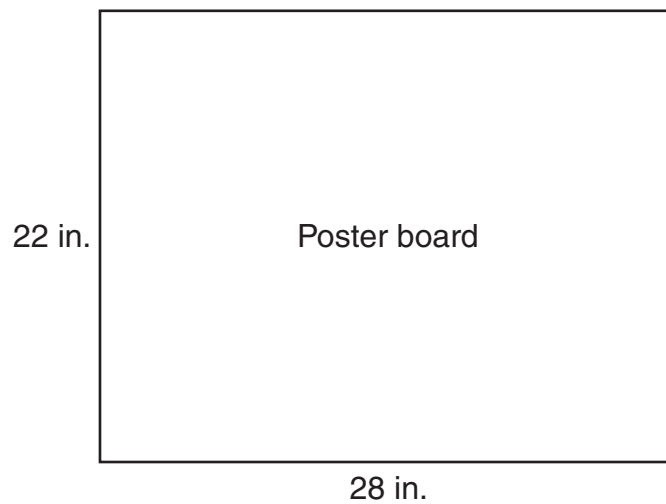
Which of the following equations represents a graph that is wider than the graph of $y = 0.2x^2$?

- A $y = 0.3x^2$
- B $y = 0.2x^2 + 1$
- C $y = 0.1x^2$
- D $y = 0.2x^2 - 1$

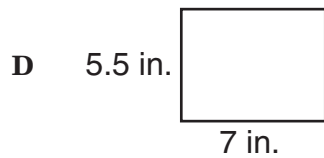
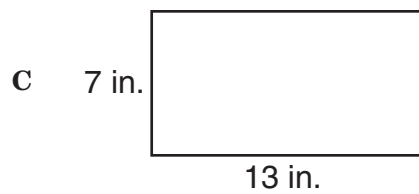
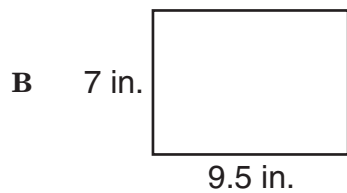
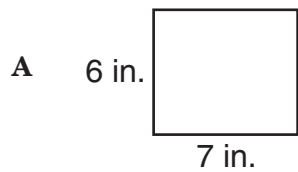
- 6 Which expression is equivalent to $5[4 + 3(x - 6)]$?

- F $15x - 10$
- G $15x - 70$
- H $15x - 14$
- J $15x - 110$

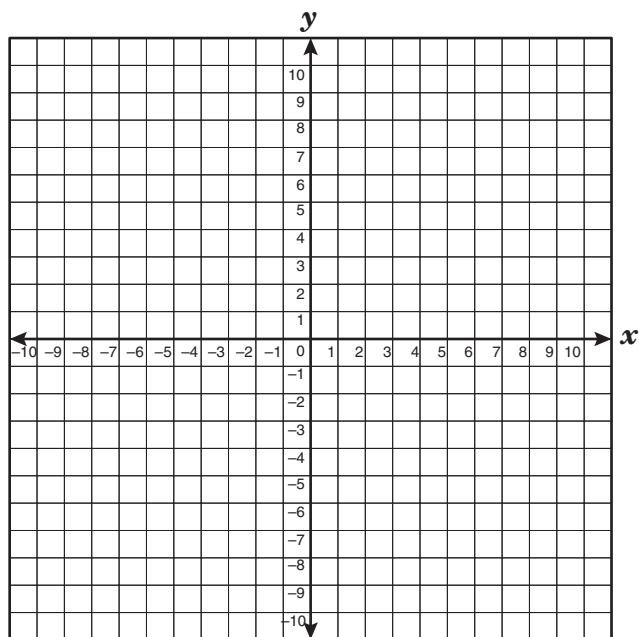
- 7 The dimensions of a rectangular poster board are shown below.



Which rectangle can be dilated to fit the exact dimensions of this poster board?



- 8 What is the equation of the line that passes through the point (9, 2) and has a y-intercept of (0, 5)?



F $y = \frac{1}{3}x + 5$

G $y = 2x + 5$

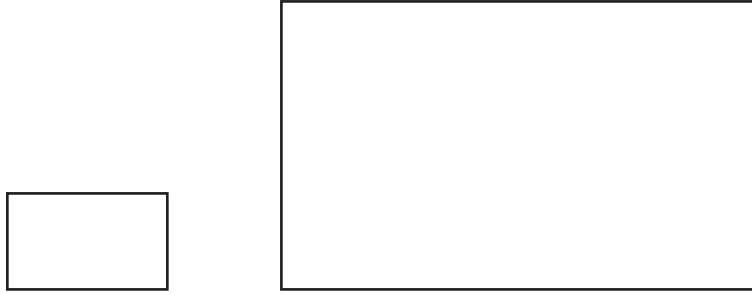
H $y = -\frac{1}{3}x + 5$

J $y = 5x + 9$

- 9 Jeri can row a boat at a speed of 8 miles per hour with the current. The number of miles, m , she rows with the current in h hours can be represented by the function $m = 8h$. Which of the following represents the dependent quantity in this function?

- A** The weight of Jeri's boat
- B** The speed of the current
- C** The amount of time Jeri rows
- D** The number of miles Jeri rows

- 10 The two rectangles shown below are similar. The ratio of the length of the larger rectangle to the length of the smaller rectangle is 3:1.



Which of the following statements is true?

- F** The area of the smaller rectangle is $\frac{1}{4}$ the area of the larger rectangle.
- G** The area of the larger rectangle is 3 times the area of the smaller rectangle.
- H** The perimeter of the smaller rectangle is $\frac{1}{3}$ the perimeter of the larger rectangle.
- J** The perimeter of the larger rectangle is 6 times the perimeter of the smaller rectangle.

-
- 11 Jason had \$87 in his savings account. He then worked for 2 weeks, earning \$5.75 per hour, and deposited all the money he earned into his savings account. The account then had a balance of \$271. Which method can be used to find the number of hours Jason worked?
- A** Subtract 87 from 271 and then divide the difference by 5.75
- B** Subtract 87 from 271 and then multiply the difference by 5.75
- C** Add 87 to 271 and then divide the sum by 5.75
- D** Add 87 to 271 and then multiply the sum by 5.75

- 12 The tables below show the amount of data in kilobytes that was downloaded by a computer over time. Which of the following tables best represents a linear function?

F

Time (seconds)	Number of Kilobytes
10	65
20	130
30	180
40	215

H

Time (seconds)	Number of Kilobytes
10	35
20	80
30	125
40	150

G

Time (seconds)	Number of Kilobytes
10	40
20	80
30	110
40	140

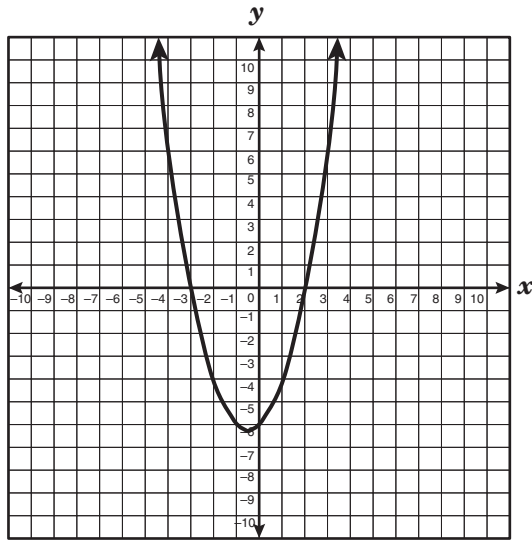
J

Time (seconds)	Number of Kilobytes
10	45
20	90
30	135
40	180

- 13 $\triangle LPT$ is an obtuse scalene triangle. If $\angle P$ is the obtuse angle in $\triangle LPT$, which of the following is not a valid conclusion?

- A** $m\angle L + m\angle T < m\angle P$
B $m\angle P + m\angle T < 90^\circ$
C $m\angle L + m\angle T < 90^\circ$
D $m\angle L + m\angle P + m\angle T = 180^\circ$

- 14 The graph of $f(x) = x^2 + x - 6$ is shown below.



Which of the following is a zero of this function?

- F -6
- G 3
- H -2
- J 2

- 15 Sabrina has a bag of 5 marbles that are identical in size. The bag contains 4 blue marbles and 1 red marble. If Sabrina randomly draws a marble from the bag, replaces it, and then draws another marble, what is the probability that she will first draw a blue marble and then a red marble?

- A $\frac{4}{25}$
- B $\frac{1}{5}$
- C $\frac{4}{5}$
- D $\frac{1}{4}$

- 16 The length of a rectangular garden is 20 feet longer than the width, w . Which equation best describes the garden's perimeter, P ?

- F $P = (w + 20) + w$
- G $P = (w + 20)w$
- H $P = (w + 20)2w$
- J $P = 2(w + 20) + 2w$

- 17** At a pet store the total cost of 8 pounds of Brand X dog food and 1 pound of Brand Y dog food is \$8.40, including tax. The total cost of 16 pounds of Brand X dog food and 8 pounds of Brand Y dog food is \$24.00, including tax. What is the price per pound of Brand Y dog food?

A \$0.90
B \$1.20
C \$2.60
D \$4.08

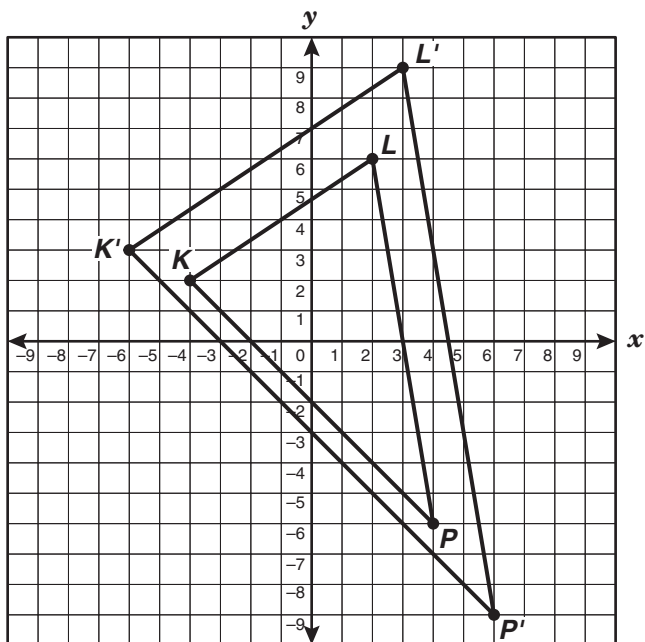
- 18** At an automobile dealership, 2 out of every 12 cars sold are red. Which is the best prediction of the number of red cars sold when the automobile dealer sells 150 cars?

F 75
G 25
H 15
J 12

- 19** Mr. García built a rectangular deck in his backyard. The deck was 16 feet long and 12 feet wide. What was the length, in feet, of the diagonal of the rectangular deck?

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

- 20 $\triangle KLP$ has vertices $K(-4, 2)$, $L(2, 6)$, and $P(4, -6)$. It is dilated to form $\triangle K'L'P'$ with the origin as the center of dilation.



If the coordinates of K' are $(-6, 3)$, what scale factor was used to form $\triangle K'L'P'$?

F $\frac{2}{3}$

G $\frac{1}{4}$

H $\frac{3}{2}$

J 4

- 21** If the area of a circle is 95 square inches, which of the following is closest to the circumference of this circle?

A 17 in.
B 35 in.
C 19 in.
D 190 in.

- 22** The formula below can be used to convert temperatures in degrees Fahrenheit, F , to temperatures in degrees Celsius, C .

$$C = \frac{5}{9}(F - 32)$$

On a certain day temperatures at the North Pole were between -20°F and -15°F . Which of these is a reasonable temperature in degrees Celsius for that day at the North Pole?

F -30°C
G -22°C
H -27°C
J -11°C

- 23** To buy a membership at a recreation center, people must pay a one-time registration fee plus a regular monthly fee. The table below shows the total amount a person pays, including the registration fee, for different numbers of months of membership.

Membership Fees

Number of Months	Total Amount Paid
4	\$150
6	\$200
12	\$350
24	\$650

According to the information in the table, which of the following statements is true?

- A** The monthly fee is \$50.
- B** The monthly fee is \$37.50.
- C** The registration fee is \$75.
- D** The registration fee is \$50.

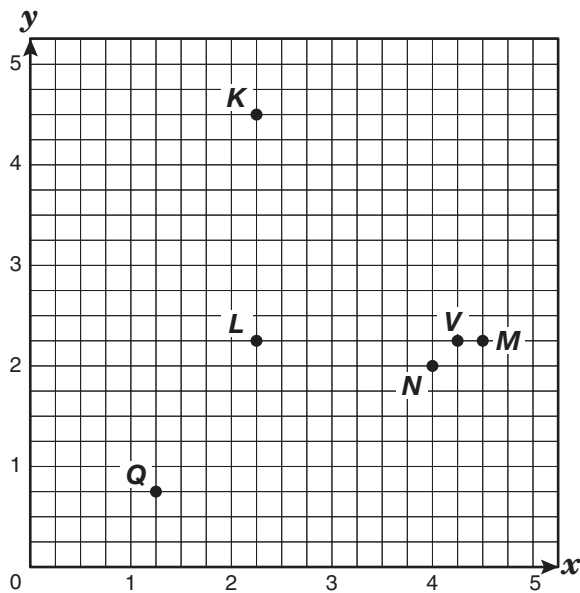
- 24** A math club is planning to sell candles to pay for the cost of attending the regional math competition. The club needs to raise a total of \$250. The candles come in boxes of 24. What additional information is needed to determine the number of candles the club needs to sell?

- F** The colors of the candles
- G** The profit the club will make on each candle sold
- H** The number of boxes ordered
- J** The number of students in the math club

25 Which statement best describes how the volume of a cube changes when the edge length is doubled to form a new cube?

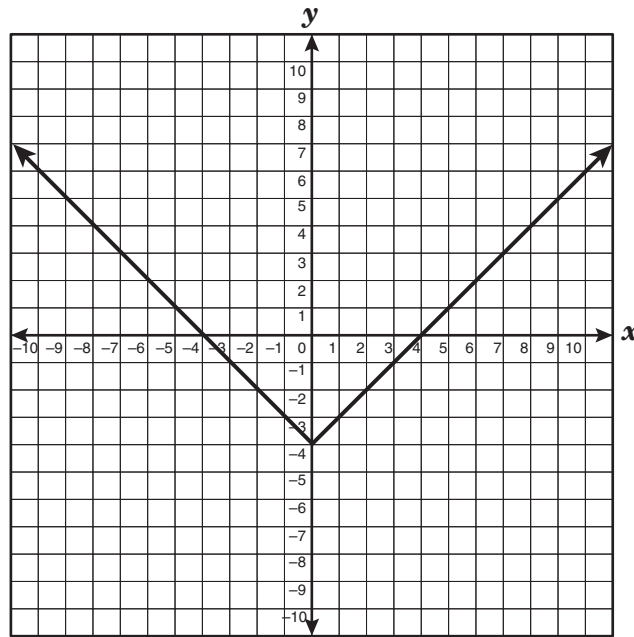
- A** The volume of the new cube is $\frac{1}{2}$ the volume of the original cube.
- B** The volume of the new cube is $\frac{1}{4}$ the volume of the original cube.
- C** The volume of the new cube is 8 times the volume of the original cube.
- D** The volume of the new cube is 4 times the volume of the original cube.

26 Which point on the grid below best represents the coordinate point $(\frac{9}{2}, \frac{9}{4})$?



- F** Point *Q*
- G** Point *M*
- H** Point *V*
- J** Point *K*

27 Which of the following best represents the range of the function shown below?

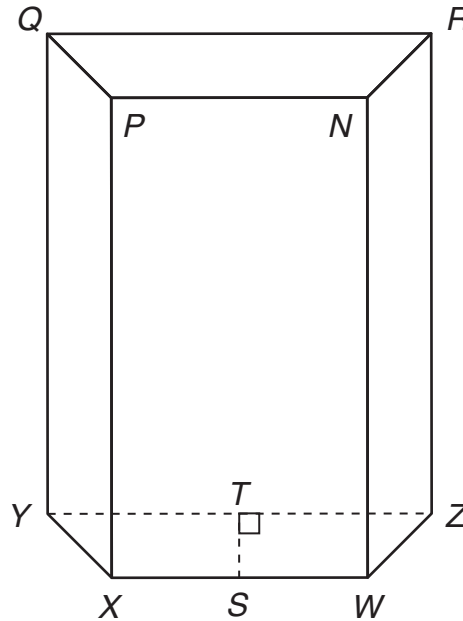


- A The range is all real numbers.
- B The range is all real numbers greater than or equal to 4.
- C The range is all real numbers greater than or equal to zero.
- D The range is all real numbers greater than or equal to -4 .

28 A spherical ball has a diameter of 10 centimeters. Which is closest to the volume of the ball?

- F 524 cm^3
- G 393 cm^3
- H 4189 cm^3
- J 105 cm^3

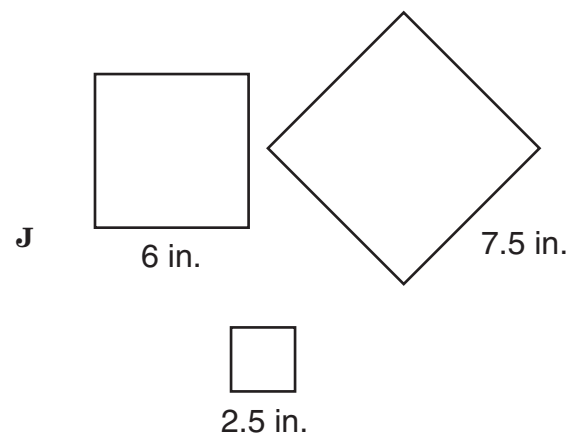
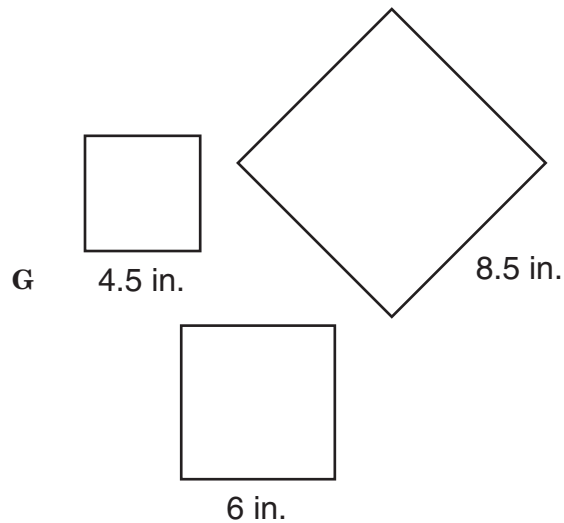
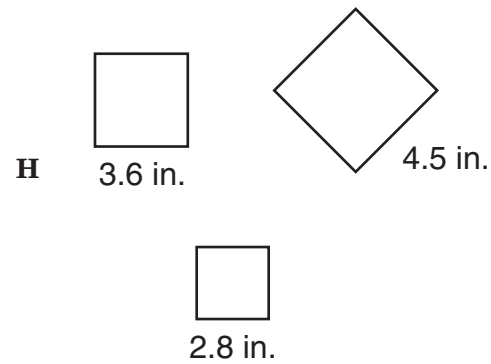
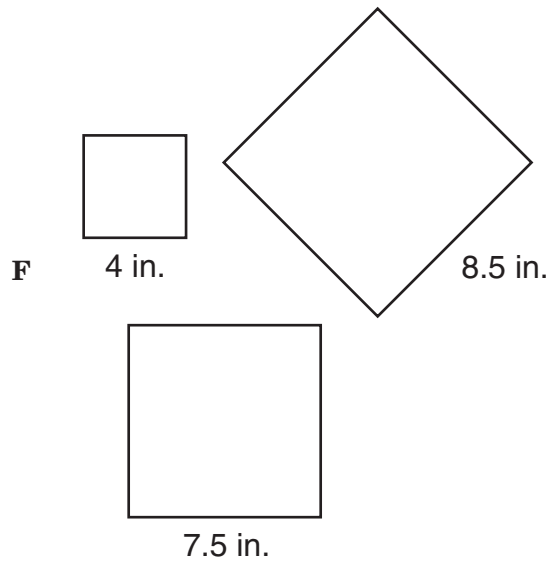
- 29** In the trapezoidal prism shown below, $NP = 8$ centimeters, and $QR = 12$ centimeters. The height of the prism is 15 centimeters.



Which additional information can be used to determine the volume of the prism?

- A** The area of rectangle $PXWN$
 - B** The area of rectangle $QYZR$
 - C** The length of \overline{NR}
 - D** The length of \overline{TS}
-
- 30** Lorraine wants to paint the 4 rectangular walls of a room, including the door. The room is 18 feet long and 12 feet wide, and the walls are 10 feet high. What is the total area that will be painted?
- F** 300 ft^2
 - G** 600 ft^2
 - H** 816 ft^2
 - J** 864 ft^2
- 31** Which of the following represents the parent function of $y = x^2 - 2x - 15$?
- A** $y = x$
 - B** $y = x^2 - 15$
 - C** $y = x^2$
 - D** $y = -2x$

32 Which group of squares can be joined at their vertices to form a right triangle?



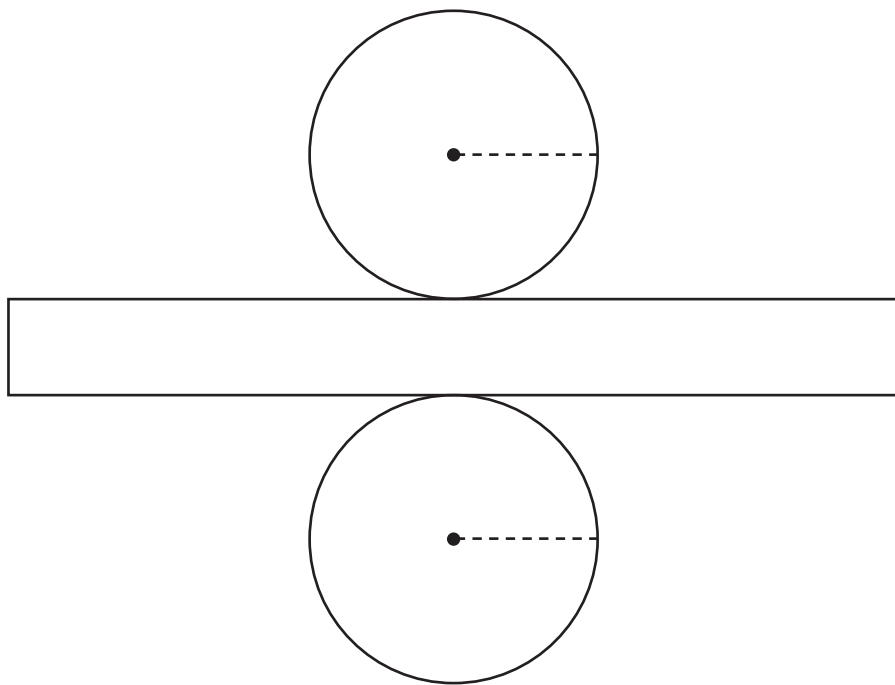
33 Ms. Lee is planning to travel a total of 1250 miles during a trip. Her car gets 30 miles per gallon on the highway and 22 miles per gallon in the city. If Ms. Lee plans to travel 1000 miles of her trip on the highway, which of these is closest to the total number of gallons of gasoline she will need for the entire trip?

- A** 38 gallons
- B** 33 gallons
- C** 45 gallons
- D** 48 gallons

34 What is the slope of the graph of the equation $3x + 2y = 6$?

- F** $\frac{2}{3}$
- G** $-\frac{3}{2}$
- H** $-\frac{2}{3}$
- J** $\frac{3}{2}$

- 35** The net of a cylinder is shown below. Use the ruler on the Mathematics Chart to measure the dimensions of the net to the nearest $\frac{1}{4}$ inch.



Which of these is closest to the total surface area of the cylinder?

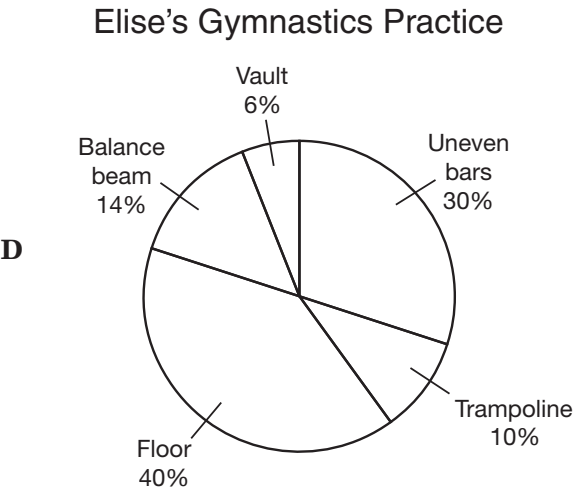
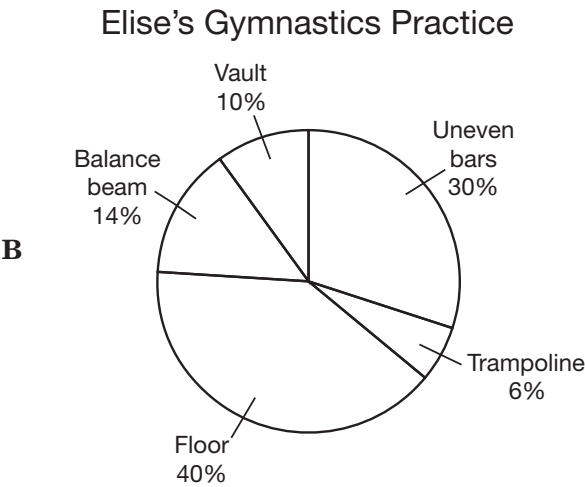
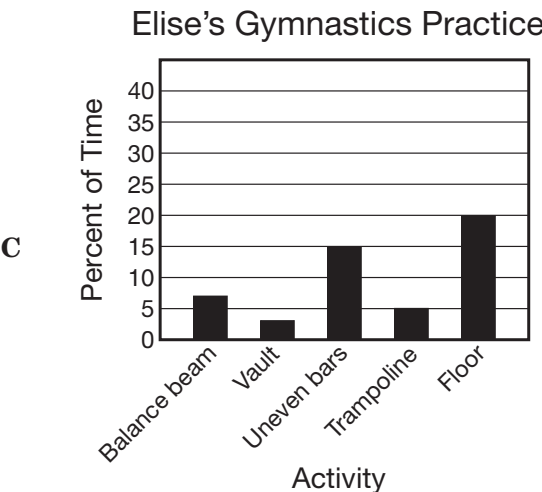
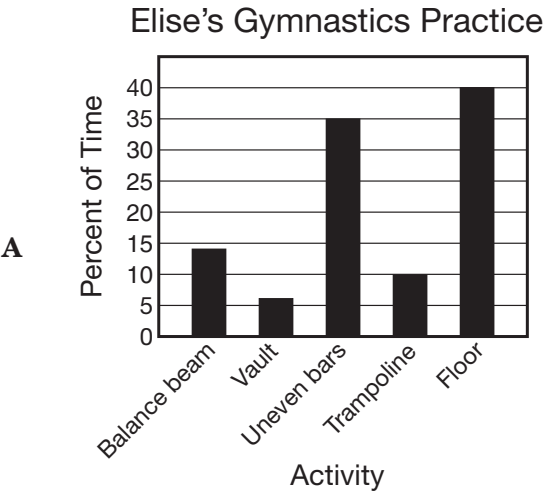
- A** 4 in.²
 - B** 2.5 in.²
 - C** 6 in.²
 - D** 1.8 in.²
-
- 36** If $c = -5$, how does the graph of $y = x^2 + 2c$ compare to the graph of $y = x^2 + c$?
- F** The graph of $y = x^2 + 2c$ is below the graph of $y = x^2 + c$.
 - G** The graph of $y = x^2 + 2c$ is above the graph of $y = x^2 + c$.
 - H** The graph of $y = x^2 + 2c$ is narrower than the graph of $y = x^2 + c$.
 - J** The graph of $y = x^2 + 2c$ is wider than the graph of $y = x^2 + c$.

37 Elise practiced gymnastics for 50 minutes. The time she spent on each activity is recorded in the table below.

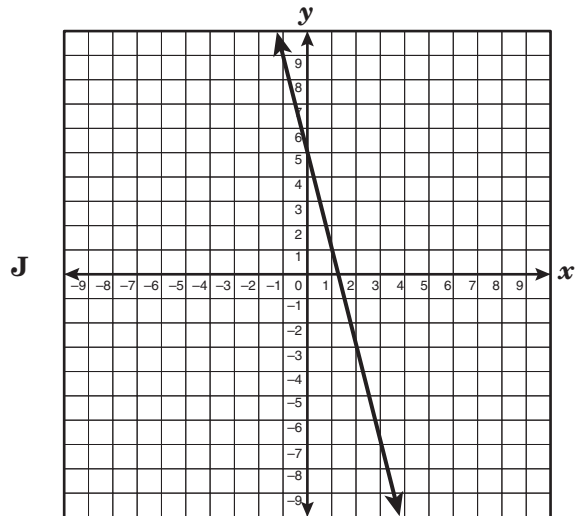
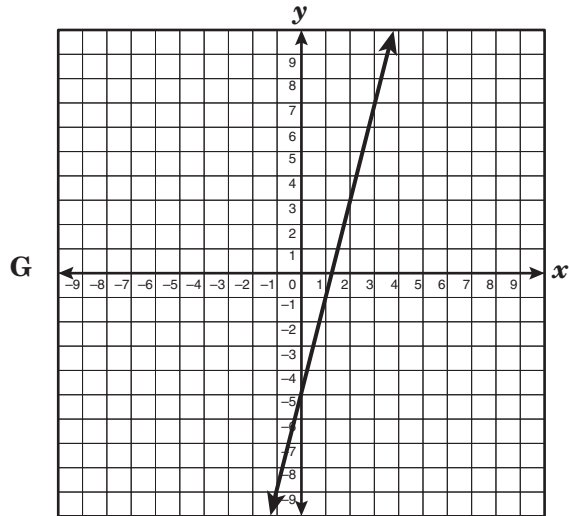
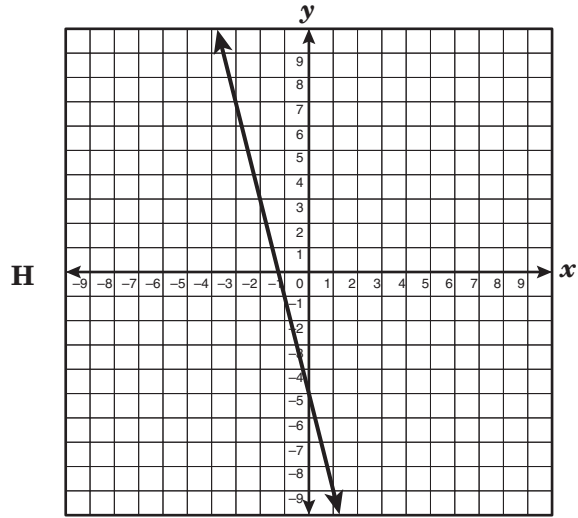
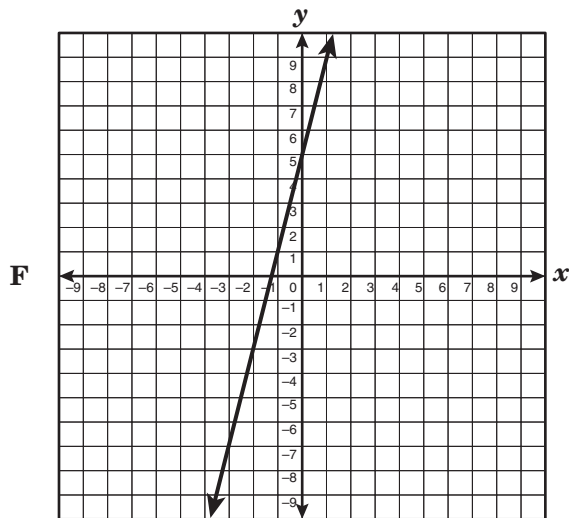
Elise’s Gymnastics Practice

Activity	Time Spent (minutes)
Balance beam	7
Vault	3
Uneven bars	15
Trampoline	5
Floor	20

Which of the following graphs best represents the percent of time Elise spent on each activity during her gymnastics practice?



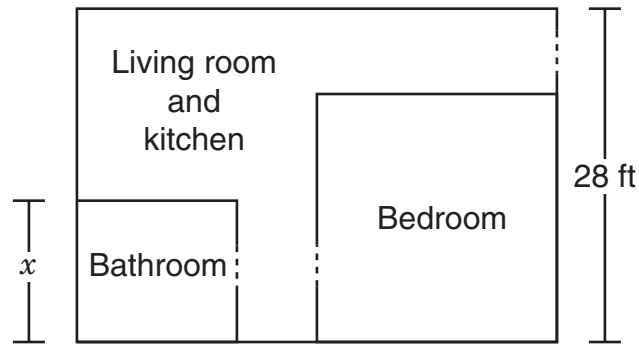
38 Which of the following best represents the graph of the equation $4x - y = -5$?



39 Jasmine bought an alarm clock that was on sale for 25% off the regular price of \$24.99. She paid an 8% sales tax on the sale price. Which of the following is closest to the amount Jasmine paid for the alarm clock, including sales tax?

- A \$18.74
- B \$22.99
- C \$17.24
- D \$20.24

- 40 The diagram below shows the floor plan of an apartment with a rectangular floor. The ratio of the width of the bathroom floor to the width of the entire apartment floor is 3:7.



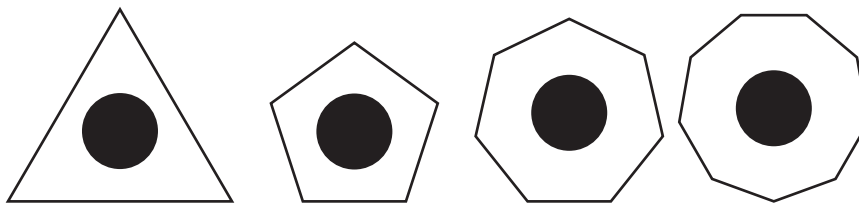
What is x , the width of the bathroom in inches?

- F 112 in.
- G 40 in.
- H 144 in.
- J 48 in.

- 41 The area, A , of a parallelogram is $64x^9y^6$ square feet. The height, h , of the parallelogram is $16x^3y^2$ feet. The area of a parallelogram can be found by using the formula $A = bh$. Which of the following best represents the length of this parallelogram's base, b ?

- A $4x^6y^4$ ft
- B $80x^{12}y^8$ ft
- C $4x^3y^3$ ft
- D $48x^6y^4$ ft

42 The following figures are examples of *keys*.



The following figures are not examples of *keys*.



According to this information, which of the following figures best represents a *key*?

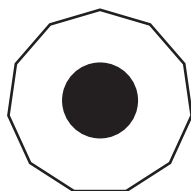
F



H



G



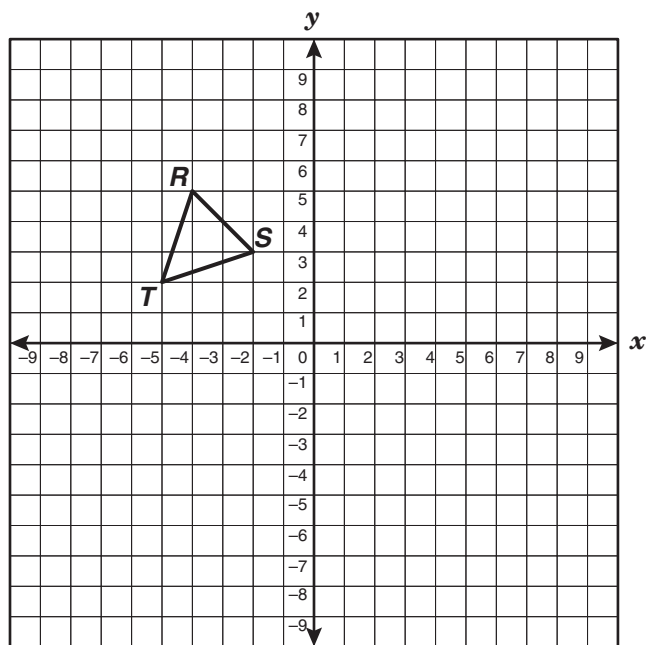
J



43 For what value of x is $(x, -3)$ a solution for $4x - 3y = 21$?

- A** 11
- B** -3
- C** -11
- D** 3

- 44 $\triangle RST$ has the vertices $R(-4, 5)$, $S(-2, 3)$, and $T(-5, 2)$.



If $\triangle RST$ is reflected across the x -axis and then translated 2 units down to become $\triangle R'S'T'$, what will be the coordinates of S' ?

- F** $(2, 1)$
- G** $(-2, -5)$
- H** $(-5, -2)$
- J** $(-2, -1)$

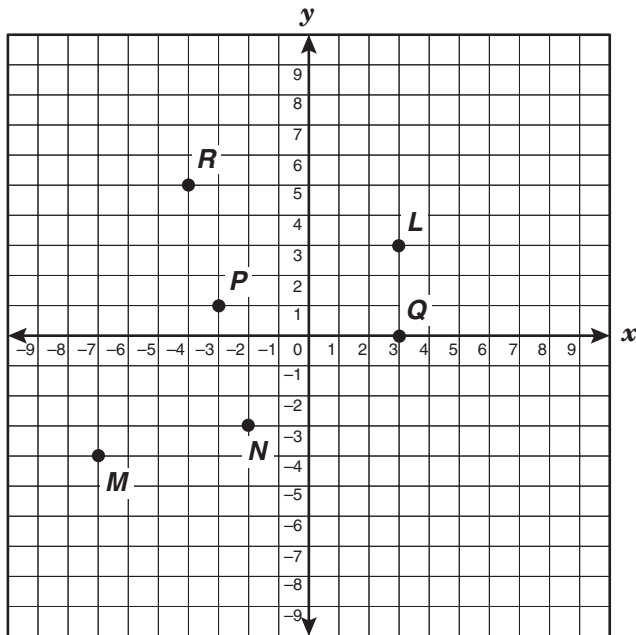
- 45 Mandy bought a bag of peanuts to share with her friends.

- Trisha received $\frac{1}{2}$ of the peanuts in the bag.
- Vince received $\frac{1}{4}$ of the peanuts Trisha received.
- Ray received $\frac{1}{3}$ of the peanuts Vince received.

If Ray received 4 peanuts, how many peanuts were in the bag Mandy bought?

- A 13
- B 32
- C 96
- D Not here

- 46 Which point on the grid satisfies the conditions $x \geq -3$ and $y \leq -1$?

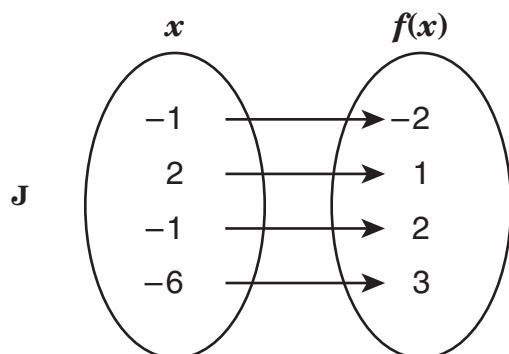
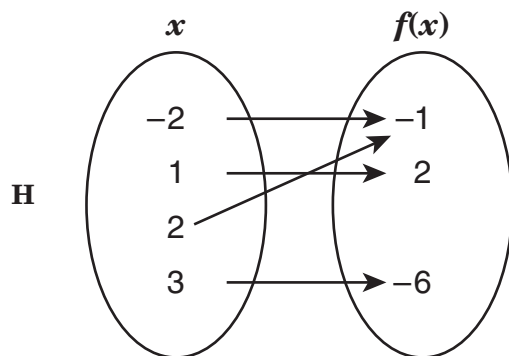
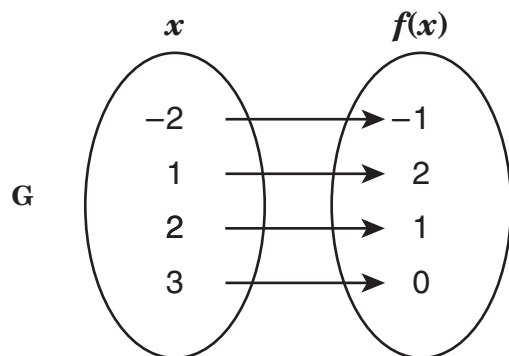
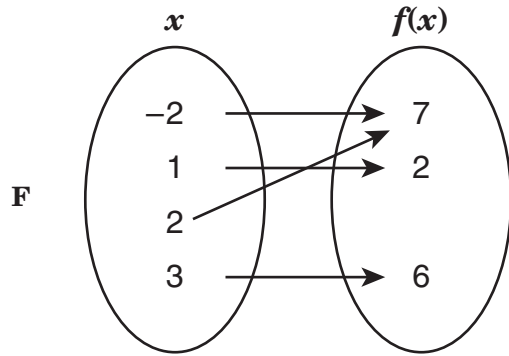


- F Point N
- G Point P
- H Point M
- J Point L

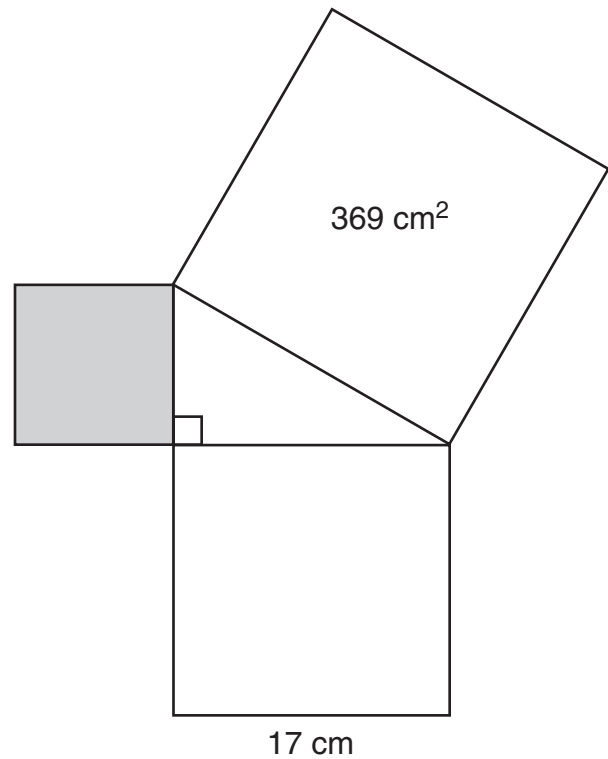
- 47 Wanda wants to buy some picture frames for her home. Small picture frames cost \$8 each, and large picture frames cost \$12 each. If Wanda wants to spend less than \$100 on picture frames, which of the following inequalities can be used to determine the number of small frames, s , and the number of large frames, l , she can buy?

- A $12s + 8l < 100$
- B $8s + 12l < 100$
- C $12s + 8l > 100$
- D $8s + 12l > 100$

- 48 Which of the following mappings best represents the function $f(x) = -x^2 + 3$?



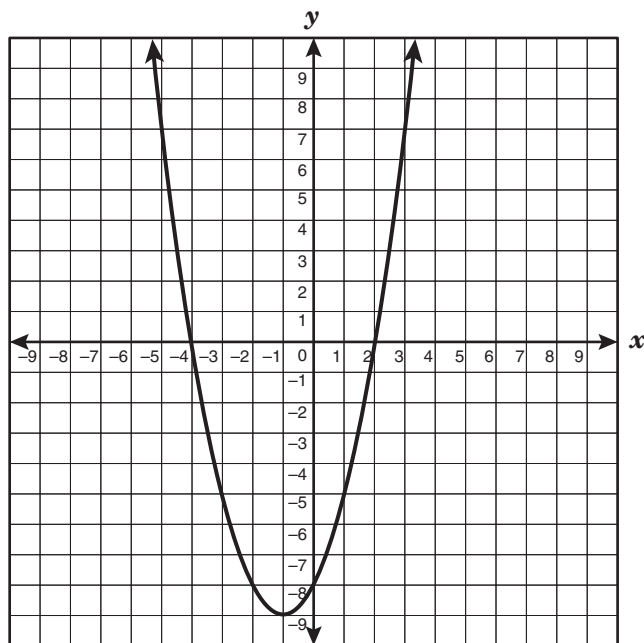
- 49 The three squares shown below are joined at their vertices to form a right triangle.



What is the area of the shaded square?

- A 80 cm^2
- B 352 cm^2
- C 2 cm^2
- D 658 cm^2

- 50 The graph of $y = x^2 + 2x - 8$ is shown below.



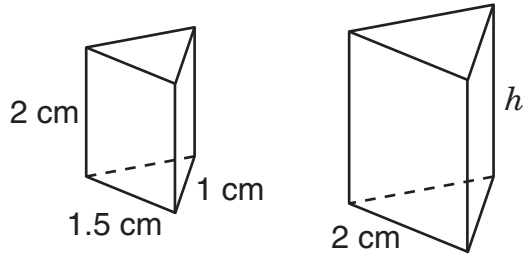
Which coordinate pair best represents the vertex of this graph?

- F** $(-4, 0)$
- G** $(2, 0)$
- H** $(0, -8)$
- J** $(-1, -9)$

-
- 51 Two complementary angles have measures of s and t . If t is 9 less than twice s , which system of linear equations can be used to determine the measure of each angle?

- A** $t + s = -9$
 $t = 2s + 90$
- B** $t - s = -9$
 $t = 2s - 90$
- C** $t + s = 90$
 $t = 2s - 9$
- D** $t + s = 90$
 $t = -2s - 9$

- 52** The two triangular prisms shown below are similar.



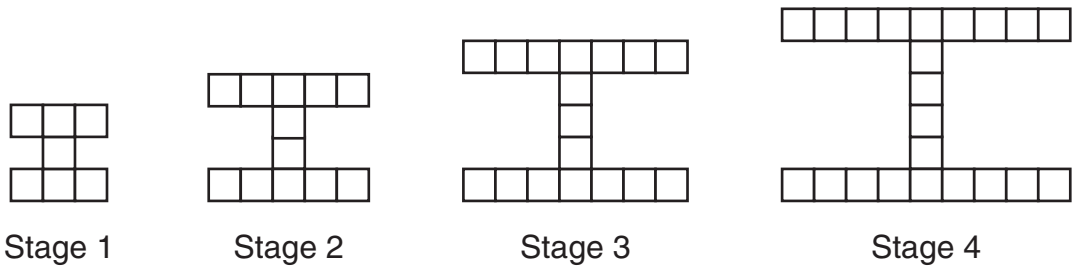
Which of these is closest to h , the height of the larger prism?

- F** 1.3 cm
- G** 2.7 cm
- H** 7 cm
- J** 1 cm

- 53** A company rented a copy machine for \$225 per month for 3 months. The company also paid \$0.012 for each copy made. If the total cost of using the copy machine during this 3-month period was \$1,107, how many copies did the company make?

- A** 148,500
- B** 92,250
- C** 73,500
- D** 36,000

54 The square tiles below are arranged to show a pattern.



Which expression can be used to determine the number of square tiles in Stage n ?

- F** $4n + 3$
- G** $5n + 2$
- H** $n^2 + 6$
- J** $n^3 + 6$

55 The table below shows the relationship between x and $f(x)$.

x	$f(x)$
-2	4
-1	2
0	0
1	-2
2	-4

Which function represents this relationship?

- A** $f(x) = 2x$
- B** $f(x) = -2x$
- C** $f(x) = -x - 2$
- D** $f(x) = x + 6$

56 If y is directly proportional to x and $y = 8$ when $x = 10$, what is the value of y when $x = 5$?

- F** 4
- G** 16
- H** 40
- J** 80

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



