



State of Texas Assessments of Academic Readiness

# **GRADE 8**

## **Mathematics**

# **Practice Assessment**



# STAAR GRADE 8 MATHEMATICS REFERENCE MATERIALS



## LINEAR EQUATIONS

Slope-intercept form  $y = mx + b$

Direct variation  $y = kx$

Slope of a line  $m = \frac{y_2 - y_1}{x_2 - x_1}$

## CIRCUMFERENCE

Circle  $C = 2\pi r$  or  $C = \pi d$

## AREA

Triangle  $A = \frac{1}{2}bh$

Rectangle or parallelogram  $A = bh$

Trapezoid  $A = \frac{1}{2}(b_1 + b_2)h$

Circle  $A = \pi r^2$

## SURFACE AREA

	Lateral	Total
Prism	$S = Ph$	$S = Ph + 2B$
Cylinder	$S = 2\pi rh$	$S = 2\pi rh + 2\pi r^2$

## VOLUME

Prism or cylinder  $V = Bh$

Pyramid or cone  $V = \frac{1}{3}Bh$

Sphere  $V = \frac{4}{3}\pi r^3$

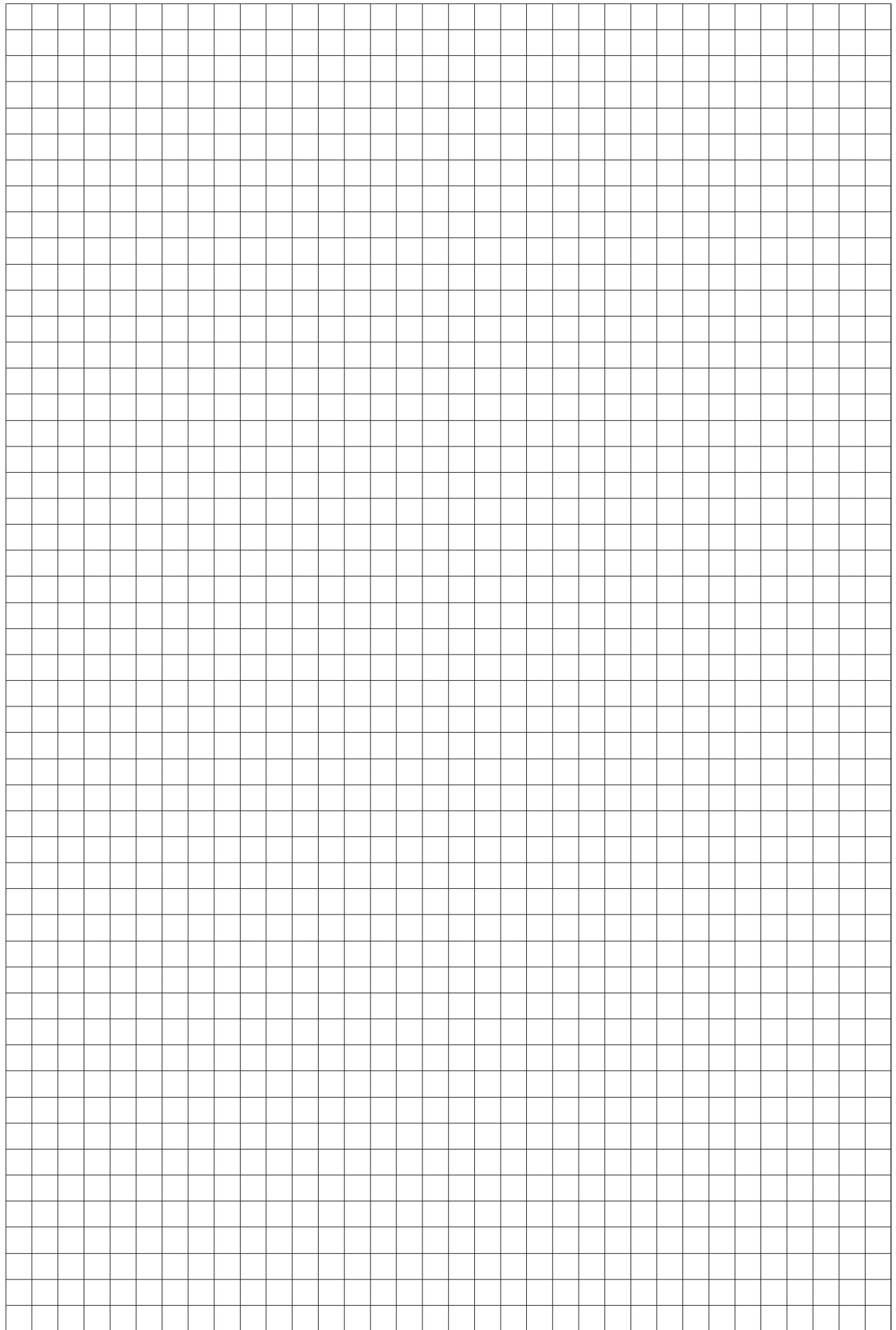
## ADDITIONAL INFORMATION

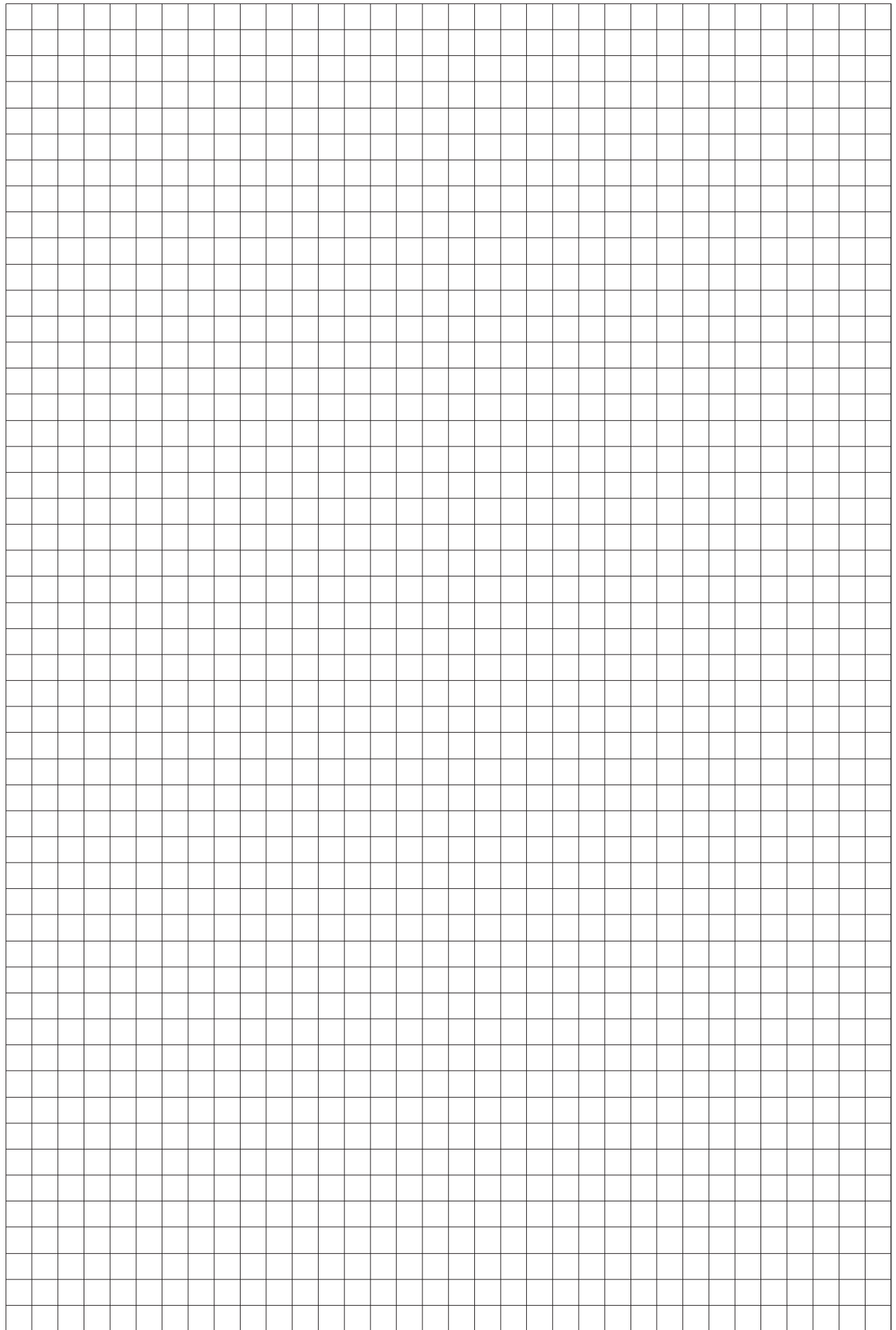
Pythagorean theorem  $a^2 + b^2 = c^2$

Simple interest  $I = Prt$

Compound interest  $A = P(1 + r)^t$







# MATHEMATICS

**DIRECTIONS**

**Read each question carefully. Choose the best answer to each question. For open-response questions, determine the best answer to the question.**

- 1** Triangle 1 is dilated by a scale factor of 4.1 using the origin as the center of dilation to create Triangle 2. Which statement about the area and perimeter of Triangle 2 is true?
- (A) The perimeter is 4.1 times the perimeter of Triangle 1, and the area is 4.1 times the area of Triangle 1.
  - (B) The perimeter is 8.2 times the perimeter of Triangle 1, and the area is 8.2 times the area of Triangle 1.
  - (C) The perimeter is 4.1 times the perimeter of Triangle 1, and the area is 16.81 times the area of Triangle 1.
  - (D) The perimeter is 16.4 times the perimeter of Triangle 1, and the area is 16.81 times the area of Triangle 1.
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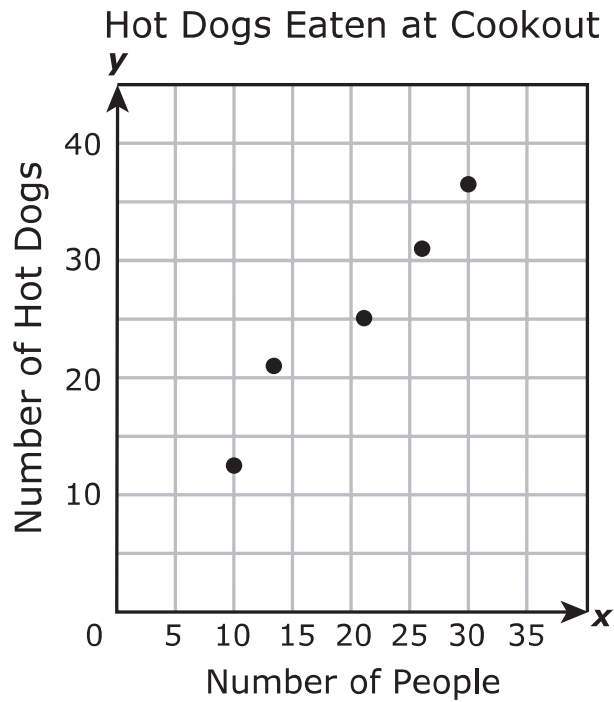
- 2** What value of  $x$  makes this equation true?

$$0.17x - 0.03 = 0.03x - 0.002$$

Record your answer in the space provided.



- 3 A family has a hot dog cookout every year. The scatterplot shows the number of people who have attended each cookout and the number of hot dogs that were eaten each year.



This year 45 people are expected to attend the cookout. Based on the scatterplot, about how many hot dogs should the family prepare?

- (A) 83
- (B) 52
- (C) 36
- (D) 40

- 4 A gas company charges a \$16 monthly service fee and \$0.6924 per hundred cubic feet of natural gas used during a month. Which equation best represents  $y$ , the gas company's monthly charges in dollars for using  $x$  hundred cubic feet of natural gas?

(A)  $y = 0.6924x - 16$

(B)  $y = 16x + 0.6924$

(C)  $y = 16x - 0.6924$

(D)  $y = 0.6924x + 16$

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- 5 Which set of side length measurements in meters does **NOT** make a right triangle?

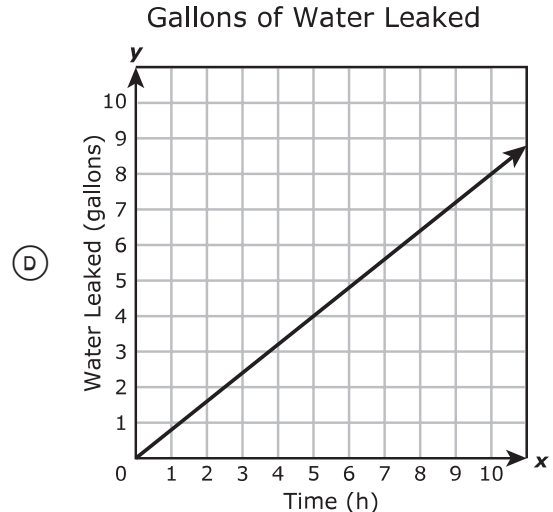
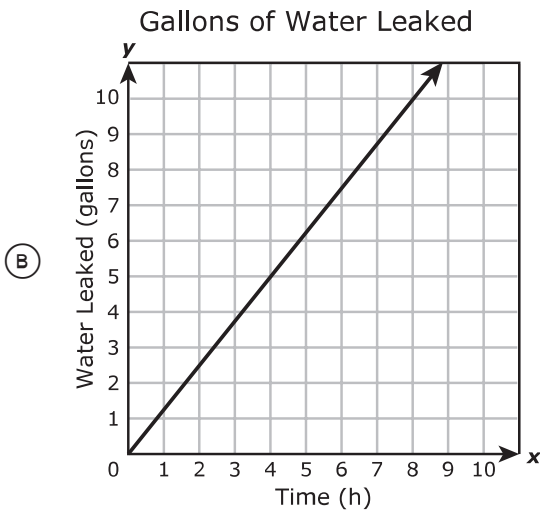
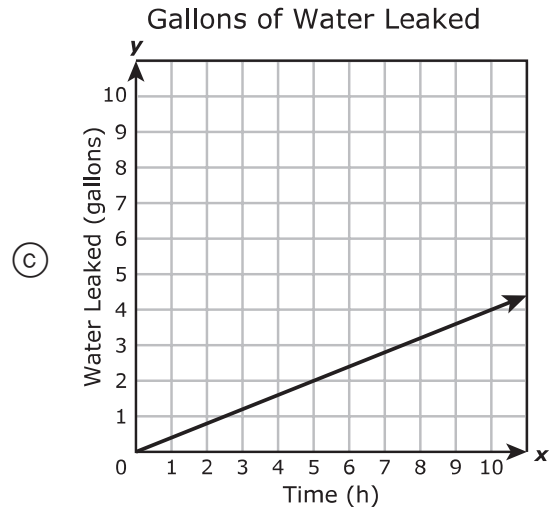
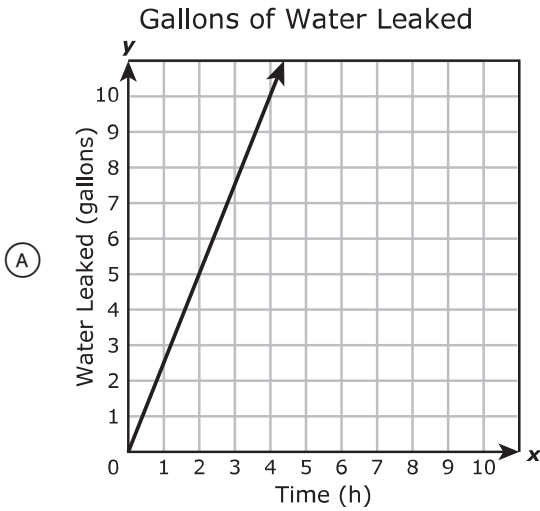
(A) 9 m   11 m   13 m

(B) 18 m   24 m   30 m

(C) 7 m   24 m   25 m

(D) 20 m   21 m   29 m

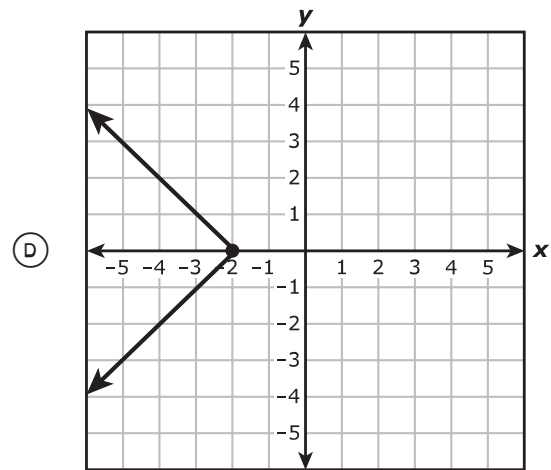
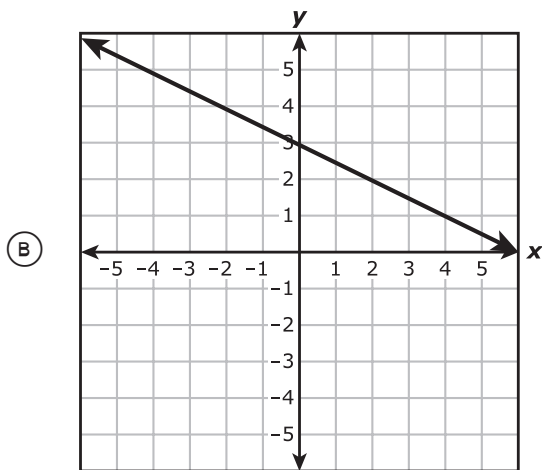
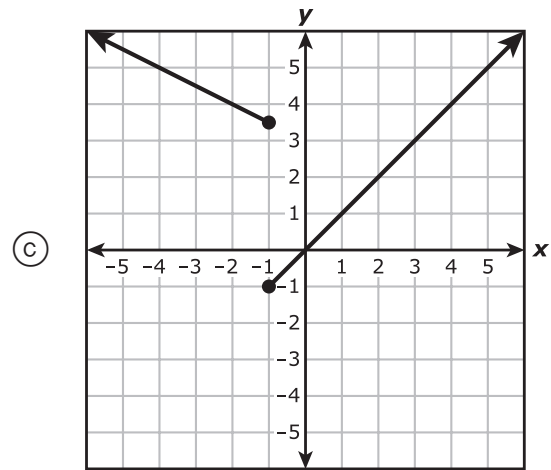
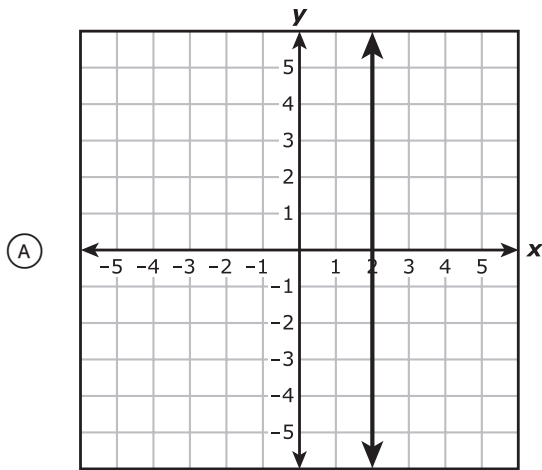
- 6 A faucet leaks 0.8 gallon of water every 2 hours. Which graph has a slope that best represents the number of gallons per hour leaked by the faucet?



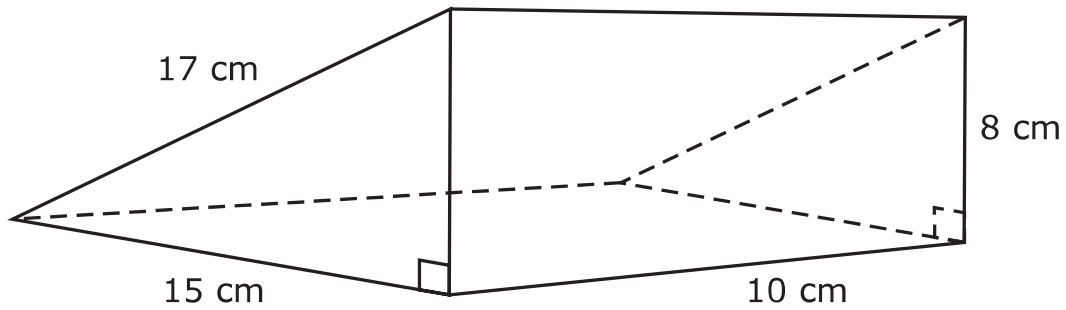
- 7 A poster storage tube in the shape of a cylinder has a diameter of 3.5 inches and a volume of  $122.5\pi$  cubic inches. What is the height of the poster storage tube in inches?

Record your answer in the space provided.

8 Which graph represents  $y$  as a function of  $x$ ?



- 9 A triangular prism and its dimensions in centimeters are shown in the diagram.



Not drawn to scale

What is the total surface area of the prism in square centimeters?

- (A)  $720 \text{ cm}^2$
- (B)  $600 \text{ cm}^2$
- (C)  $460 \text{ cm}^2$
- (D)  $520 \text{ cm}^2$

- 10** The total annual cost to attend a community college is \$4,000. The college offered a high school senior a scholarship for \$1,500. The student can get a student loan for \$1,000 but will need to earn enough to pay the remaining cost. It is 5 months until the remaining cost must be paid.

What is the minimum amount the student needs to earn per month to save enough money to pay the remaining cost?

- (A) \$300
- (B) \$600
- (C) \$500
- (D) \$800

- 
- 11** Determine whether each situation represents a proportional or a non-proportional relationship.

Select **ONE** correct answer in each row.

Situation	Proportional	Non-proportional
The total number of text messages sent if 4 were already sent and 6 messages are sent per day	(A)	(B)
The number of characters in a text message if each word contains 6 characters	(A)	(B)
The number of minutes it takes to enter a text message at 50 characters per minute	(A)	(B)
The time it takes to send a text message if it takes 30 seconds to open the app and the sender enters 1 character per second	(A)	(B)

- 12** The tables show the ordered pairs that represent the vertices of Triangle 1 and its image, Triangle 2, after a dilation with the origin as the center of dilation.

Triangle 1		Triangle 2	
$x$	$y$	$x$	$y$
2	-2	10	-10
3	-6	15	-30
5	-4	25	-20

Which rule best represents the dilation that was applied to Triangle 1 to create Triangle 2?

- Ⓐ  $(x, y) \rightarrow (0.2x, 0.2y)$
- Ⓑ  $(x, y) \rightarrow (5x, 5y)$
- Ⓒ  $(x, y) \rightarrow (8x, 8y)$
- Ⓓ  $(x, y) \rightarrow (10x, 10y)$



- 13** After  $x$  hours of rainfall today, Yvette recorded the amount of rain in inches,  $y$ , in a rain gauge. The table shows the linear relationship for the recorded rainfall.

Rain Gauge

Time, $x$ (hours)	3	4	5
Amount of Rain in Gauge, $y$ (inches)	3.75	4.5	5.25

How many inches of rain was in the gauge before the rain began today, and what was the rate at which the rain fell in inches per hour?

- (A) There was 0 inches in the rain gauge before the rain began, and the rain fell at a rate of 1.25 inches per hour.
- (B) There was 2.5 inches in the rain gauge before the rain began, and the rain fell at a rate of 1.25 inches per hour.
- (C) There was 3 inches in the rain gauge before the rain began, and the rain fell at a rate of 0.75 inch per hour.
- (D) There was 1.5 inches in the rain gauge before the rain began, and the rain fell at a rate of 0.75 inch per hour.

**14** Four numbers are shown.

$$-3\frac{1}{4} \quad -\sqrt{9} \quad -3.2 \quad -\pi$$

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

(A)  $-\sqrt{9} \quad -\pi \quad -3.2 \quad -3\frac{1}{4}$

(B)  $-\sqrt{9} \quad -\pi \quad -3\frac{1}{4} \quad -3.2$

(C)  $-\pi \quad -3\frac{1}{4} \quad -3.2 \quad -\sqrt{9}$

(D)  $-3\frac{1}{4} \quad -3.2 \quad -\pi \quad -\sqrt{9}$

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**15** A circle with center  $R(-4, -4)$  on a coordinate plane is transformed so that its image forms a circle with center  $R'(-4, 4)$ .

Which rules describe transformations that result in a circle with center  $R'$ ?

Select **TWO** correct answers.

$(x, y) \rightarrow (x, y + 4)$

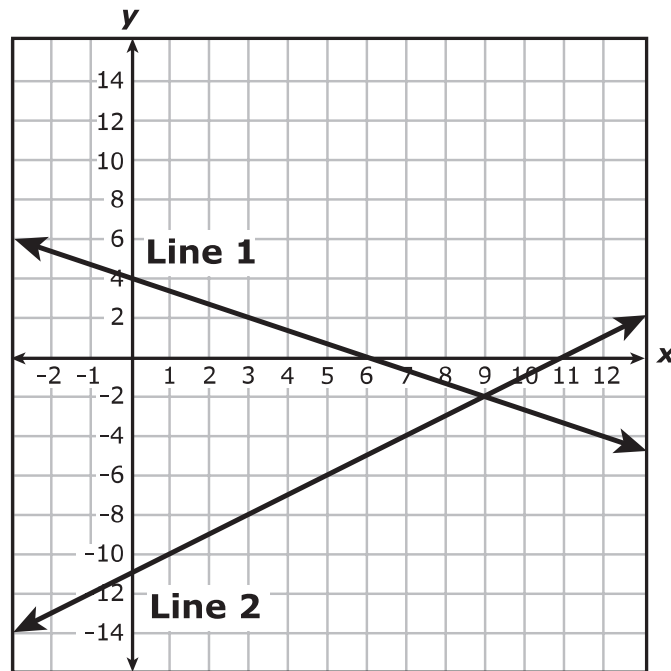
$(x, y) \rightarrow (-x, y)$

$(x, y) \rightarrow (x, y + 8)$

$(x, y) \rightarrow (x, -y)$

$(x, y) \rightarrow (-y, x)$

- 16 The two lines graphed on the coordinate grid represent a system of linear equations.



Which ordered pair best represents a solution to both equations?

- (A) (4, -11)
- (B) (0, 4)
- (C) (9, -2)
- (D) (6, 11)

- 17** Jackson invested \$680.00 in an account that earns 1.5% simple interest annually. He made no additional deposits or withdrawals for 2 years.

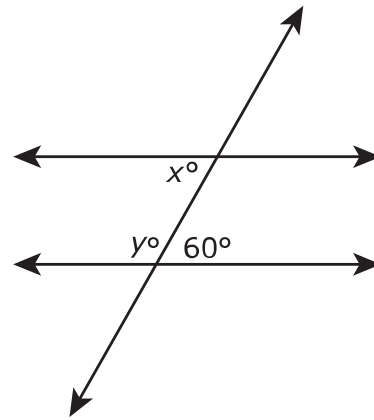
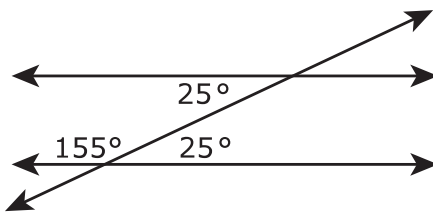
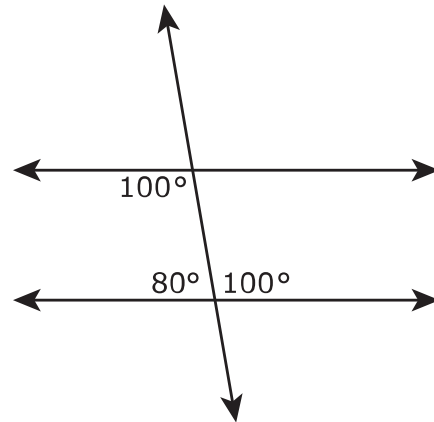
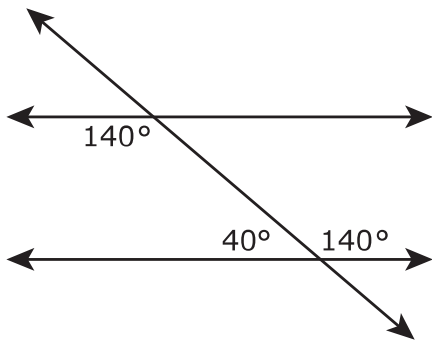
What was Jackson's account balance at the end of 2 years?

- (A) \$700.40
  - (B) \$690.20
  - (C) \$884.00
  - (D) \$782.00
- 

- 18** Which equation does **NOT** show a proportional relationship between  $x$  and  $y$ ?

- (A)  $y = \frac{x}{12}$
- (B)  $y = -15x$
- (C)  $y = \frac{2}{3}x$
- (D)  $y = 7x - 9$

- 19 Each of these four diagrams shows a pair of parallel lines intersected by a transversal that forms the angles shown.



Complete the equations to make them true.

Select the correct answer for each box. Not all answers will be used.

**A** 60    **B** 90    **C** 120    **D** 180

$$x = \boxed{\text{A} \quad \text{B} \quad \text{C} \quad \text{D}}$$

$$x + y = \boxed{\text{A} \quad \text{B} \quad \text{C} \quad \text{D}}$$

**20** An online candy store sells 3 pounds of fudge for \$54.99. Which function represents the relationship between  $x$ , the number of pounds of fudge ordered, and  $y$ , the total cost in dollars?

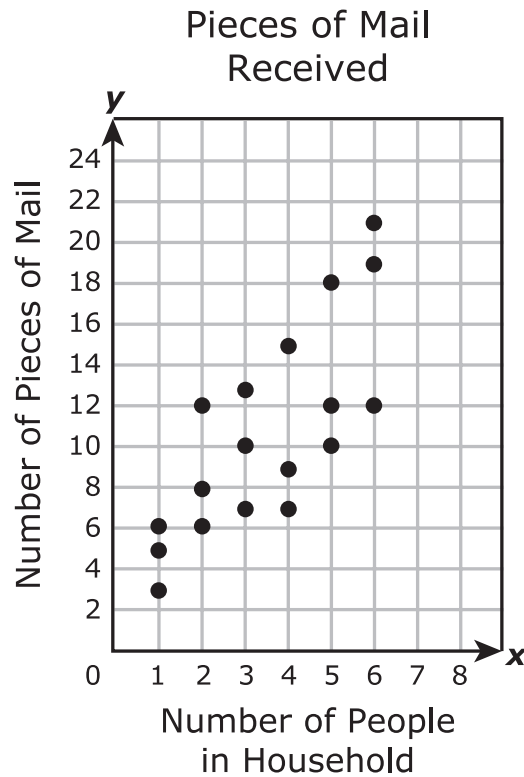
(A)  $y = 3(54.99)x$

(B)  $y = \frac{54.99}{3}x$

(C)  $y = (54.99 - 3)x$

(D)  $y = 54.99x - 3$

- 21** A mail carrier recorded the number of people in each household on the mail route and the number of pieces of mail each household received in one day. The scatterplot shows the data the mail carrier recorded.



Based on the data, how many pieces of mail should a household with 8 people expect to receive?

- (A) 16
- (B) 29
- (C) 27
- (D) 21

22 Which table does **NOT** represent  $y$  as a function of  $x$ ?

(A)

$x$	$y$
-5	-5
-2	0
-5	5
-2	10

(B)

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

(C)

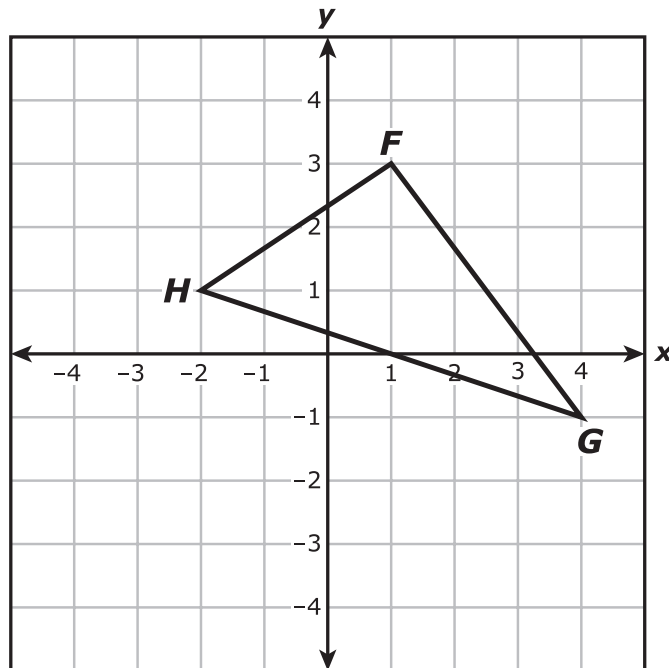
$x$	$y$
-5	-15
-2	-6
5	15
8	24

(D)

$x$	$y$
-5	10
0	10
5	10
10	10



23 Triangle  $FGH$  is shown on the coordinate plane.



Triangle  $FGH$  is rotated  $90^\circ$  clockwise to create triangle  $F'G'H'$ .

Select **ONE** correct answer in each box to complete each sentence.

Triangle  $F'G'H'$  is  to triangle  $FGH$ .

(A) congruent  
 (B) similar but not congruent  
 (C) not similar

The orientation of the vertices of triangle  $F'G'H'$   the same as the orientation of the vertices of triangle  $FGH$ .

(A) is  
 (B) is not

**24** The volume of salt water on Earth's surface is approximately 350,000,000,000,000,000 gallons. How is this number written in scientific notation?

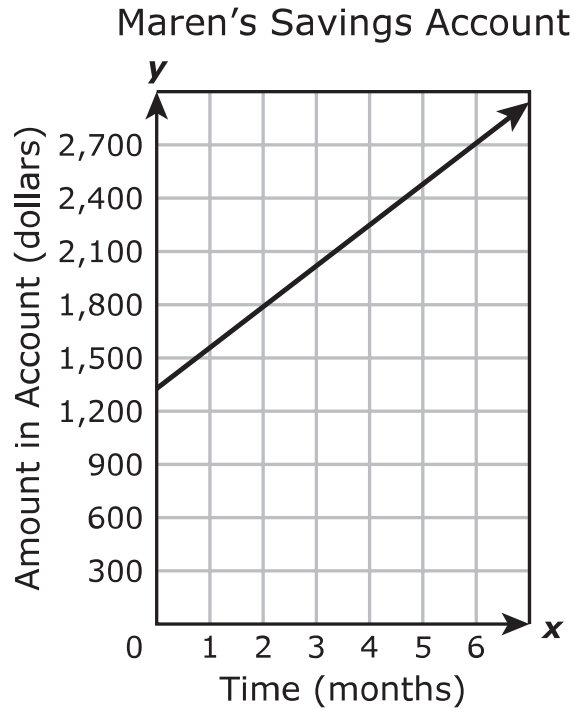
(A)  $3.5 \times 10^{16}$

(B)  $3.5 \times 10^{20}$

(C)  $35 \times 10^{16}$

(D)  $35 \times 10^{20}$

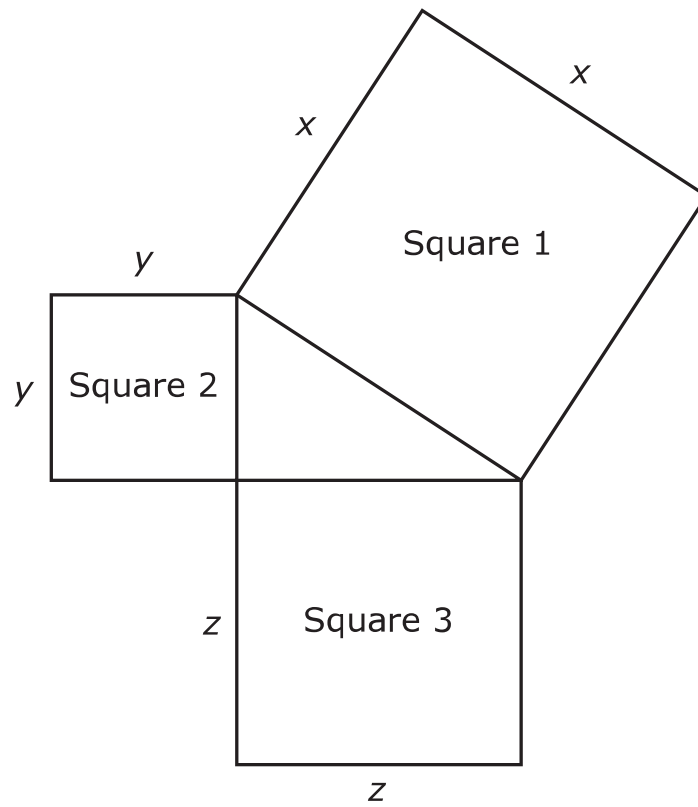
- 25** Maren made an initial deposit into her savings account. Each month Maren deposits the same amount into the savings account. The graph shows the linear relationship between  $x$ , the number of months Maren's savings account has been open, and  $y$ , the amount of money in the account.



Which amount best represents Maren's initial deposit in dollars?

- (A) \$450
- (B) \$900
- (C) \$1,350
- (D) \$1,575

**26** A triangle is shown, with Squares 1, 2, and 3 drawn on its sides.



Which measurements in units for the sides of the squares show that the triangle is a right triangle?

- (A)  $x = 10, y = 6, z = 8$
- (B)  $x = 4, y = 2, z = 3$
- (C)  $x = 9, y = 5, z = 7$
- (D)  $x = 7, y = 3, z = 4$

- 27** A pentagon has side lengths in units of  $\sqrt{325}$ ,  $18\frac{3}{5}$ , 17.99,  $18\frac{5}{12}$  and  $\sqrt{290}$ .

Which statements about the side lengths of the pentagon are true?

Select **TWO** correct answers.

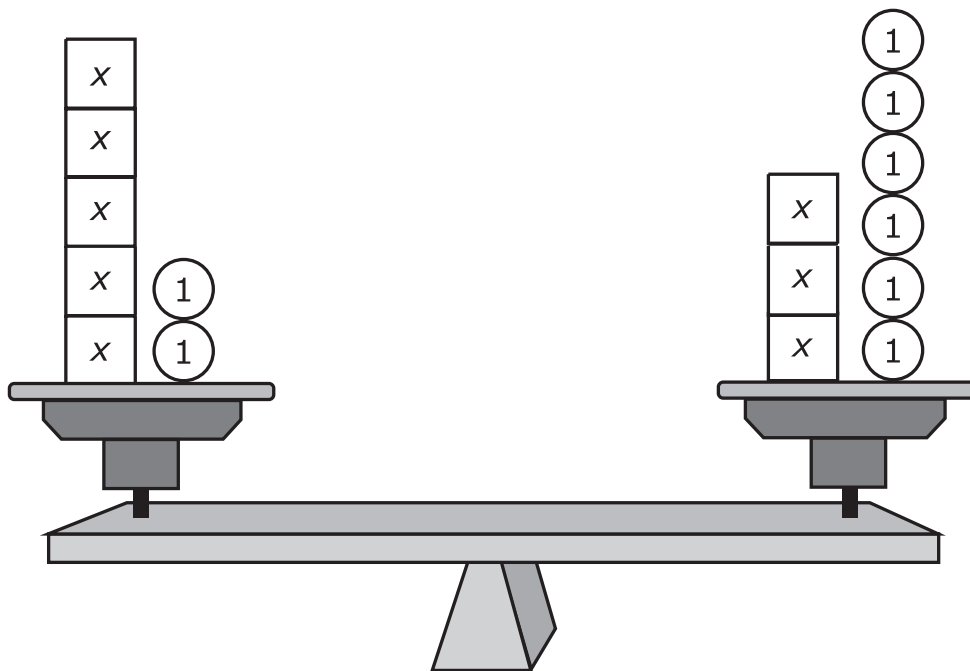
- The shortest side of the pentagon has a length of  $\sqrt{290}$  units.
- The longest side of the pentagon has a length of  $18\frac{5}{12}$  units.
- $\sqrt{325} > 18\frac{3}{5}$
- $17.99 < \sqrt{290}$
- $18\frac{3}{5} > 18\frac{5}{12}$
- 

- 28** A box of rice is shaped like a rectangular prism. The box has a length of 6 inches, a width of 1.5 inches, and a height of 8.5 inches.

What is the total surface area of the box in square inches?

- (A) 136.5 in.<sup>2</sup>
- (B) 76.5 in.<sup>2</sup>
- (C) 145.5 in.<sup>2</sup>
- (D) 127.5 in.<sup>2</sup>

29 The model represents an equation.



Based on the model, what is the value of  $x$ ?

- (A)  $x = 3$
- (B)  $x = 2$
- (C)  $x = 4$
- (D)  $x = 1$

**30** Triangle  $KLM$  is rotated  $270^\circ$  clockwise about the origin to create triangle  $K'L'M'$ . Which rule describes the transformation that is applied to triangle  $KLM$ ?

- (A)  $(x, y) \rightarrow (y, -x)$
- (B)  $(x, y) \rightarrow (-x, -y)$
- (C)  $(x, y) \rightarrow (-x, y)$
- (D)  $(x, y) \rightarrow (-y, x)$

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**31** The table shows several pairs of  $x$ - and  $y$ -values for a linear relationship.

$x$	$y$
-4	-10
-1	-3
2	4
5	11

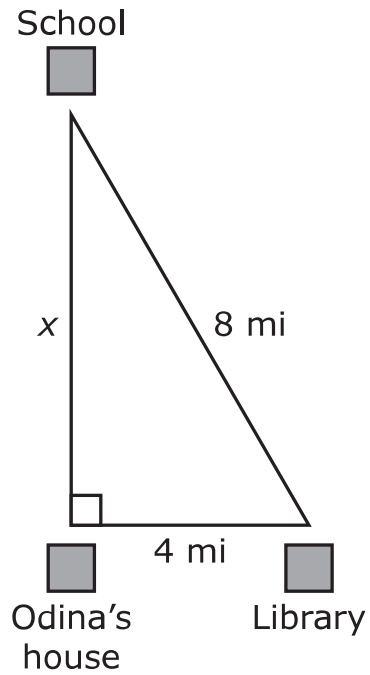
Create an equation in slope-intercept form that can be used to model this relationship.

Select the correct answer for each box. Not all answers will be used.

**A**  $-5\frac{1}{3}$    **B**  $-2\frac{4}{7}$    **C**  $-\frac{2}{3}$    **D**  $\frac{3}{7}$    **E**  $\frac{2}{3}$    **F**  $\frac{7}{3}$

$$y = \boxed{\text{A } \text{B } \text{C } \text{D } \text{E } \text{F}}x + \boxed{\text{A } \text{B } \text{C } \text{D } \text{E } \text{F}}$$

- 32 The diagram shows the distance between Odina's house and the library in miles. It also shows the distance between the library and the school.



Which measurement is closest to  $x$ , the distance in miles from Odina's house to the school?

- (A) 8.9 mi
- (B) 4 mi
- (C) 6.9 mi
- (D) 12 mi



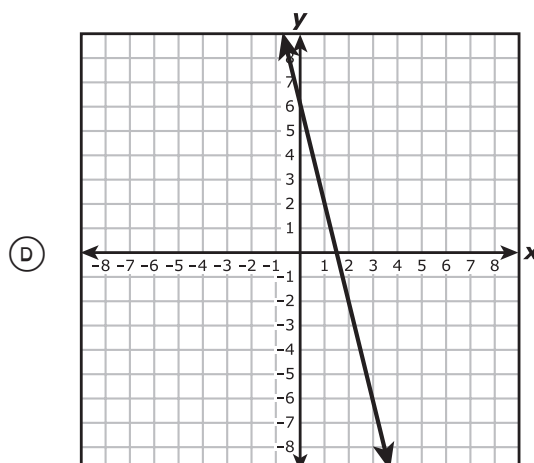
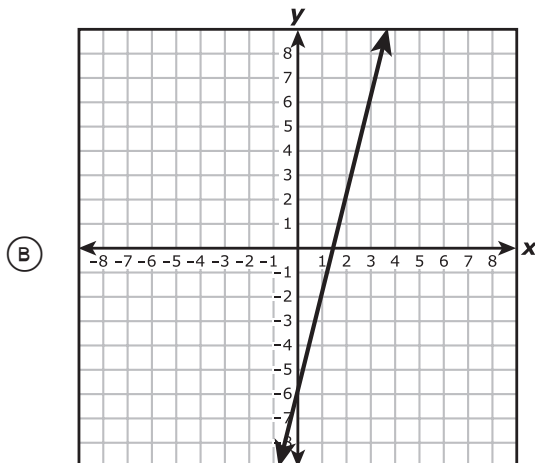
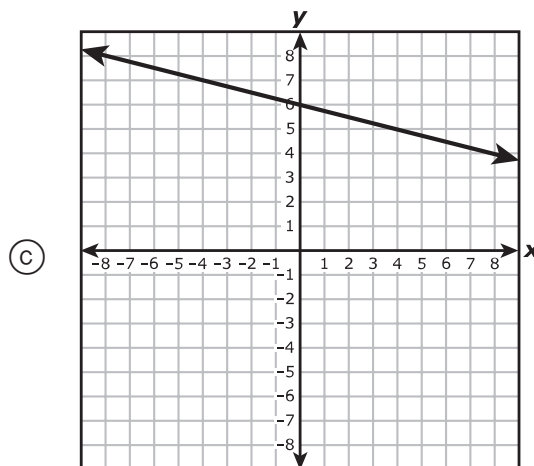
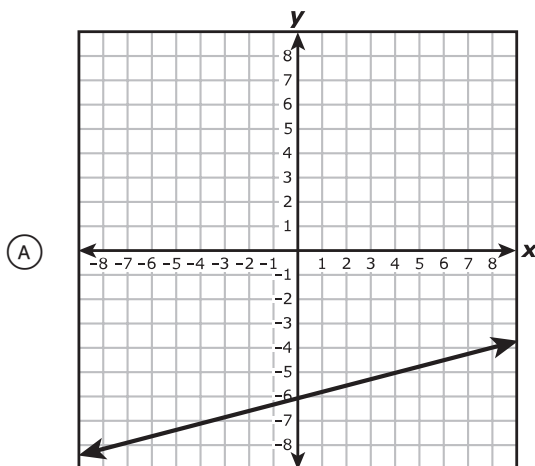
**33** An investor deposited \$6,100.00 in an investment account.

- The account pays 3.1% interest compounded annually.
- The investor leaves the money in the account for 2 years.
- The investor makes no additional deposits or withdrawals.

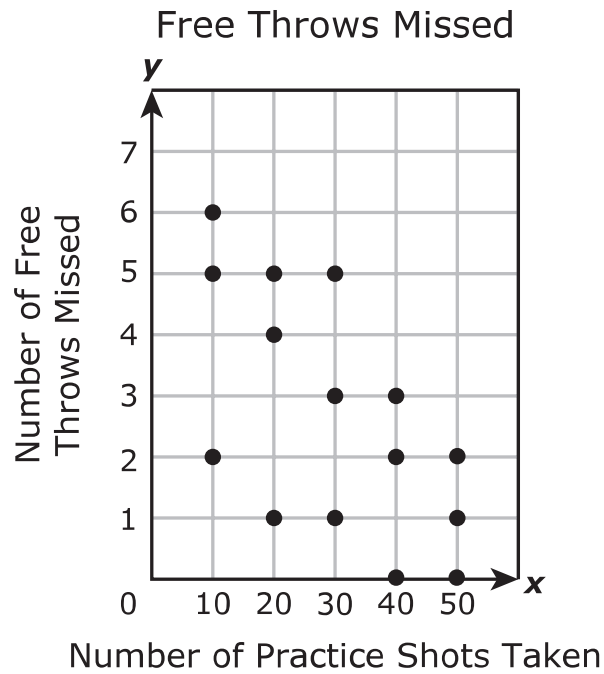
What is the balance in the account at the end of the 2 years?

- Ⓐ \$6,289.10
- Ⓑ \$6,478.20
- Ⓒ \$6,484.06
- Ⓓ \$6,686.21

- 34 The value of  $y$  is 6 less than the quotient of  $x$  and 4. Which graph best shows this relationship?



- 35 The scatterplot shows the number of practice shots a basketball team took during each practice and the number of free throws the team missed in its next game.



Complete the sentences to describe the trend in the data.

Select **ONE** correct answer in each box to complete each sentence.

The data show that as the number of practice shots taken increases,

the number of free throws missed

- |                                     |
|-------------------------------------|
| <input type="radio"/> (A) decreases |
| <input type="radio"/> (B) increases |

This trend has a

- |                                  |                                    |
|----------------------------------|------------------------------------|
| <input type="radio"/> (A) strong | <input type="radio"/> (A) negative |
| <input type="radio"/> (B) weak   | <input type="radio"/> (B) positive |

linear association.

- 36** A triangle on a coordinate plane has one vertex at  $(-7, -14)$ . After a dilation with the origin as the center of dilation, the corresponding vertex of the dilated triangle is located at  $(-1, -2)$ .

Which rule represents the dilation applied to the triangle?

- (A)  $(x, y) \rightarrow \left(\frac{1}{7}x, \frac{1}{7}y\right)$
- (B)  $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$
- (C)  $(x, y) \rightarrow (7x, 7y)$
- (D)  $(x, y) \rightarrow (2x, 2y)$
- 

- 37** Which situation can be represented by the inequality

$$2x + 18 < 3x + 11?$$

- (A) Tori is on the 18th step from the bottom of a staircase and goes up 3 steps every second. Naoki is on the 11th step from the bottom and goes up 2 steps every second. After how many seconds,  $x$ , will Naoki pass Tori?
- (B) Ana has made 18 bracelets and continues to make 2 bracelets each day. Elliot has made 11 bracelets and continues to make 3 bracelets each day. After how many days,  $x$ , will Elliot have more bracelets than Ana?
- (C) Gina has \$2 in her savings account and adds \$18 each week. Hiram has \$3 in his savings account and adds \$11 each week. After how many weeks,  $x$ , will Gina have more money in her savings account than Hiram?
- (D) Dhara has eaten 18 french fries and continues to eat 2 with each bite. Kendrick has eaten 11 french fries and continues to eat 3 with each bite. After how many bites,  $x$ , will Dhara have eaten more french fries than Kendrick?

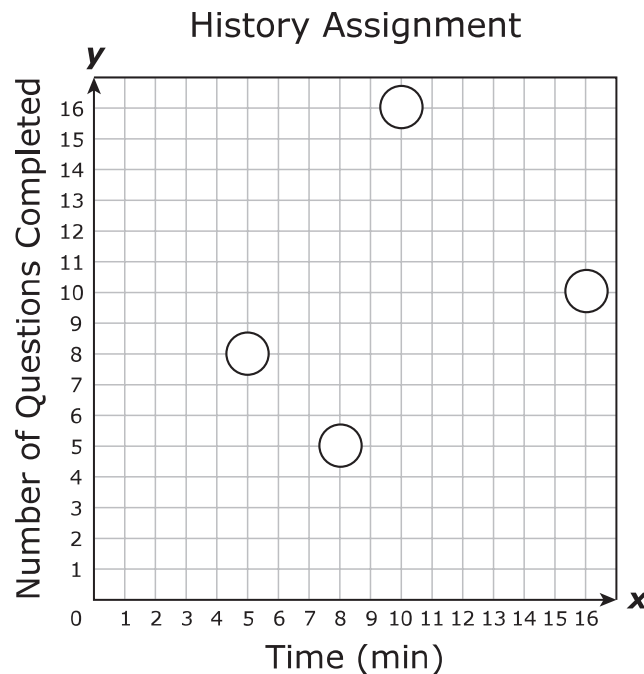
**38** A cone has a radius of 6 centimeters and a height of 10 centimeters. What is the volume of the cone in cubic centimeters?

- (A)  $480\pi \text{ cm}^3$
- (B)  $120\pi \text{ cm}^3$
- (C)  $360\pi \text{ cm}^3$
- (D)  $60\pi \text{ cm}^3$

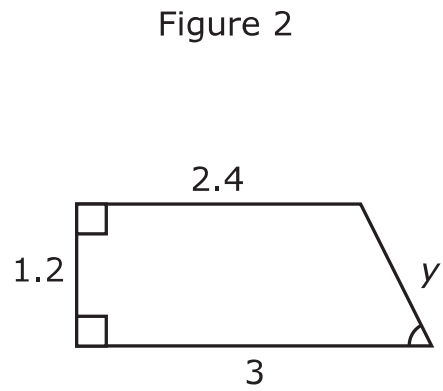
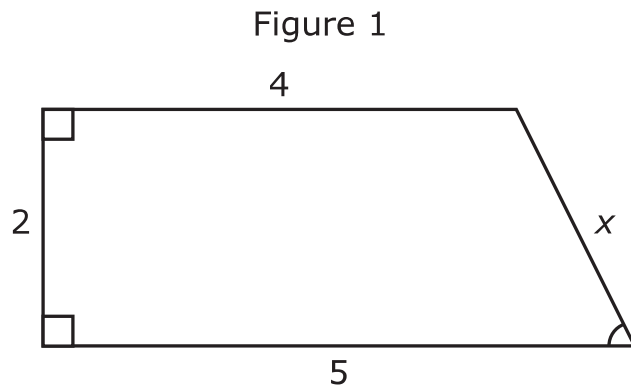
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**39** A student took 32 minutes to complete a 20-question history assignment. Choose two points that lie on the line with the slope that best represents the number of questions completed per minute.

Shade the **TWO** correct circles that represent the points.



- 40 Figure 1 and Figure 2 are similar and have the measurements shown in units.



Based on the figures, which proportion is true?

- (A)  $\frac{x}{y} = \frac{3}{5}$
- (B)  $\frac{x}{y} = \frac{2}{4}$
- (C)  $\frac{x}{y} = \frac{4}{2}$
- (D)  $\frac{x}{y} = \frac{5}{3}$



**STAAR  
GRADE 8  
Mathematics  
PRACTICE**

