

**TEST NAME: Math Gr 8 FAIM 2016 Form 1-A**  
**TEST ID: 1549479**  
**GRADE: Eighth Grade**  
**SUBJECT: Mathematics**  
**TEST CATEGORY: State Interim Assessment**

Student:

Class:

Date:

1. If a relation  $(x, y)$  is a linear function, it can be written in the form  $y = mx + b$ , where  $m$  and  $b$  are constants. Which of the following equations can be expressed in this form?

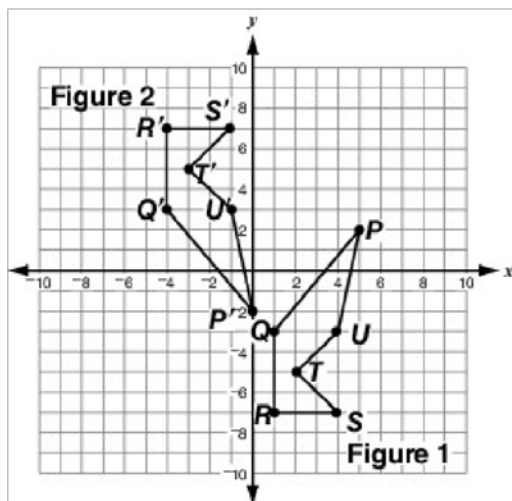
A.  $y = 2x(-3x)$

B.  $x(3 + y) = 6$

C.  $2x - 3y = 6$

D.  $2x(3y) = 6$

2. Figure 1 and figure 2 are shown on the coordinate plane below.



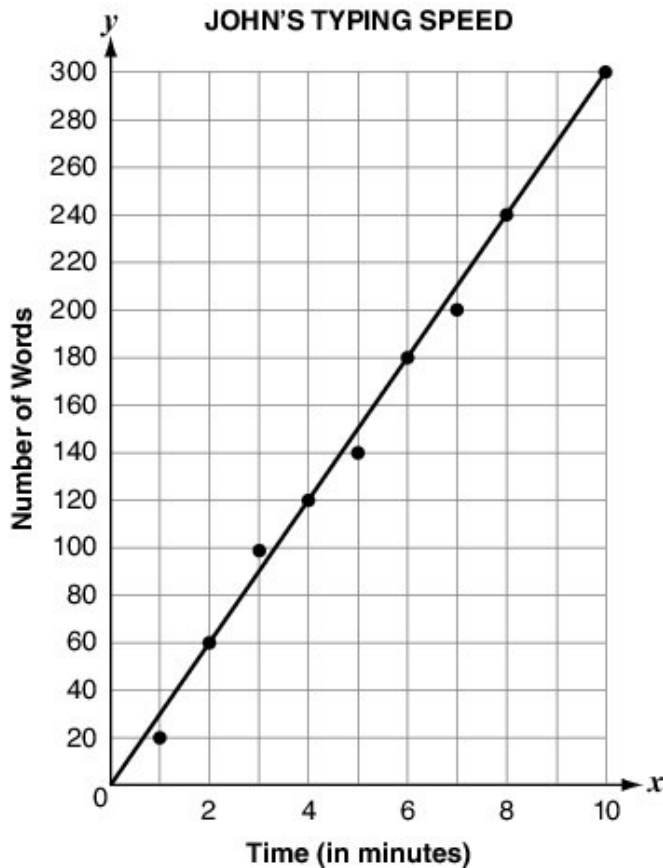
Which series of transformations can be used to prove that figure 1 is congruent to figure 2?

- A. rotation of  $90^\circ$  counterclockwise about the origin and then translation 5 units left
- B. rotation of  $90^\circ$  counterclockwise about the origin and then translation 5 units up
- C. reflection across the  $x$ -axis and then translation 5 units left
- D. reflection across the  $x$ -axis and then translation 5 units up

3. Simplify the expression below. Write your answer in scientific notation.

$$\frac{5.8 \times 10^7}{2.9 \times 10^{-9}}$$

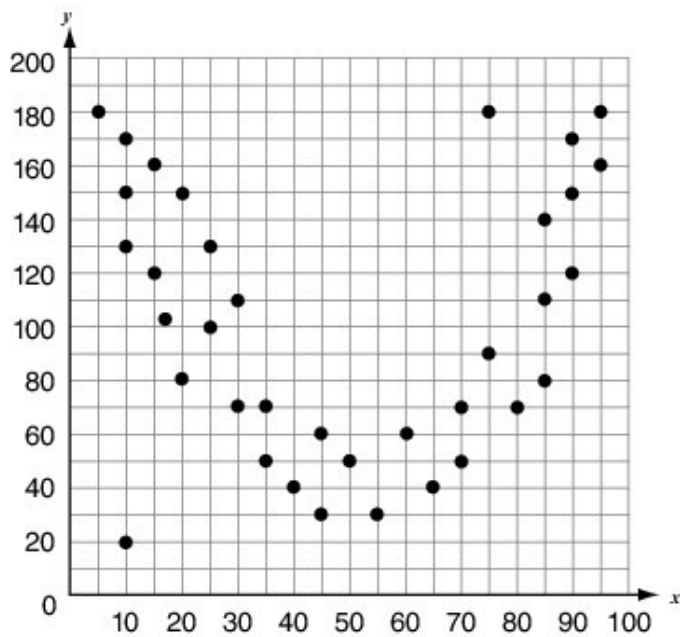
4. John records the number of words he has typed over several minutes. He plots the data and draws a line of best fit as shown in the scatter plot below. If John has to type an article that has 1500 words, how many words will he have left to type after 20 minutes?



- A. 50 words  
B. 75 words  
C. 600 words  
D. 900 words
5. What is the value of the expression  $\frac{5 \cdot 2^3}{2^{-3}}$ ?

6. Write a rational number in fraction form that is equivalent to  $-1.\overline{5}$ .
7. Mr. Rodriguez has a square garden with an area of 324 square feet. He wants to put a fence along 3 sides of the garden. What is the fewest number of feet of fencing he will need?
8. Which statements are true?
- I.  $y = x^2$  is a function
  - II.  $y^2 = x$  is a function
  - III.  $y = x^2$  is not a function
  - IV.  $y^2 = x$  is not a function
- A. I and II
  - B. II and III
  - C. I and IV
  - D. III and IV
9. Between what two integers on a number line would  $\sqrt{29}$  be plotted?

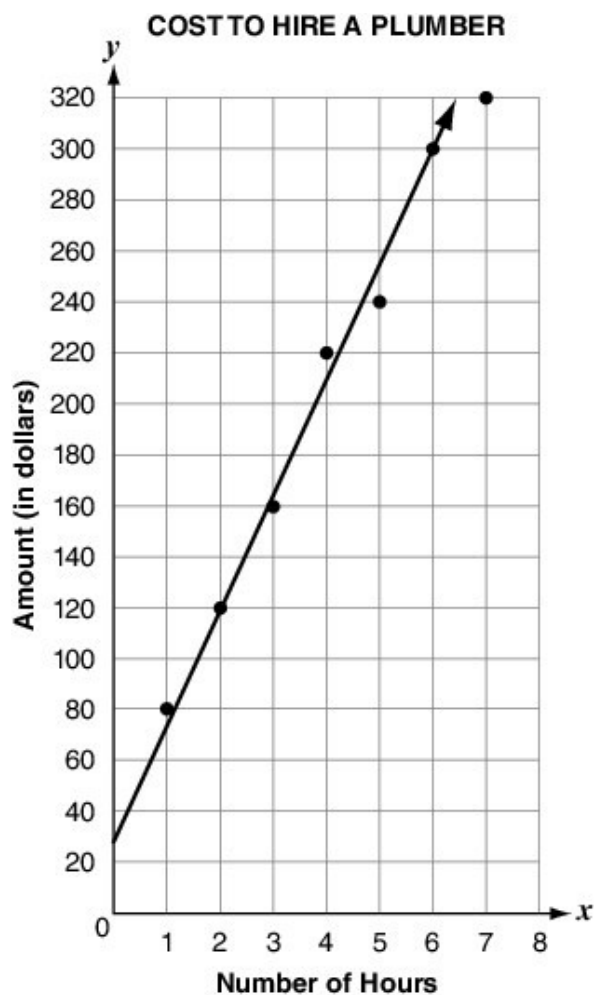
10. The results of an experiment are plotted on the coordinate grid shown below.



Which statement **best** describes the relationship between variables in the experiment?

- A. The relationship between variables can be described as a negative linear association with an outlier at (75, 180).
- B. The relationship between variables can be described as a negative linear association with an outlier at (10, 20).
- C. The relationship between variables can be described as a nonlinear association with an outlier at (75, 180).
- D. The relationship between variables can be described as a nonlinear association with an outlier at (10, 20).

11. The cost to hire a plumber for  $x$  hours is shown on the graph.



For this graph, what does the  $y$ -intercept of the line of best fit mean in terms of the context?

12. George surveyed the students in his class about their study habits. The table below shows the results of the survey.

	Study Less than 2 Hours	Study More than 2 Hours	Total
Boys	12	8	20
Girls	4	11	15
Total	16	19	35

What is the relative frequency of the students in George's class who study less than 2 hours?

- A.  $\frac{4}{16}$
- B.  $\frac{16}{35}$
- C.  $\frac{19}{35}$
- D.  $\frac{12}{16}$

13. Danisha and Maria are reading a book for their Language Arts class. The table and the equation below represent their reading speeds in terms of chapters read over time.

Danisha's table:

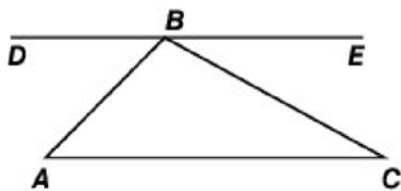
Time (minutes)	Number of Chapters Read
0	0
15	1
30	2
45	3
60	4

Maria's equation:  $c = 0.02t$ , where  $t$  represents time in minutes and  $c$  represents number of chapters.

Which of the following statements is true?

- A. The ratio of Maria's speed to Danisha's speed is 0.02 to 4.
- B. The ratio of Maria's speed to Danisha's speed is 3 to 10.
- C. The ratio of Maria's speed to Danisha's speed is 10 to 3.
- D. The ratio of Maria's speed to Danisha's speed is 0.98 to 1.

14. In the figure below,  $\overline{AC}$  and  $\overline{DE}$  are parallel.



Andy lists the steps to show that the sum of angles in a triangle is  $180^\circ$ , as shown below.

Step 1:  $m\angle DBA + m\angle ABC + m\angle EBC = 180^\circ$  (sum is a straight angle.)

Step 2:  $m\angle DBA = m\angle BAC$

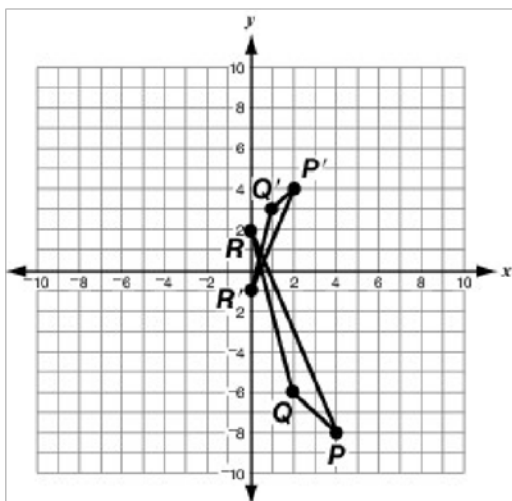
Step 3:  $m\angle EBC = m\angle ACB$

Step 4:  $m\angle BAC + m\angle ABC + m\angle ACB = 180^\circ$

What justifies step 2 and step 3?



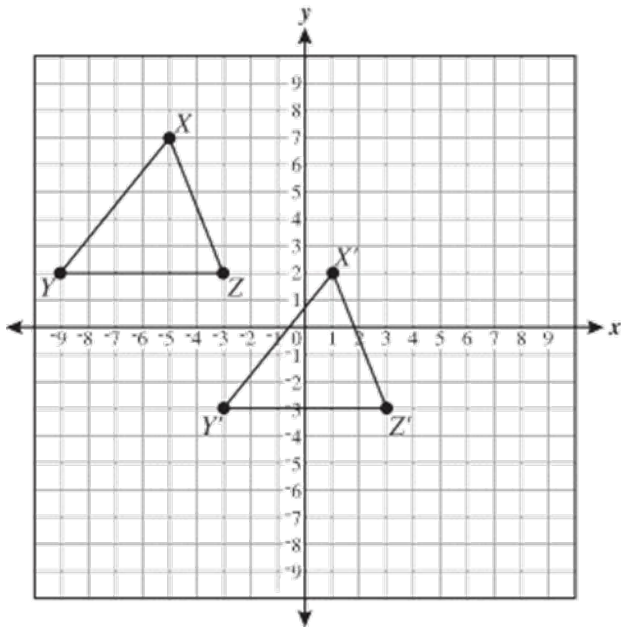
15. The figure below shows similar triangles  $PQR$  and  $P'Q'R'$ .



Which sequence of transformations produces triangle  $P'Q'R'$  from triangle  $PQR$ ?

- A.
- 1) Dilation by the scale factor of  $\frac{1}{2}$
  - 2) Rotation  $90^\circ$  counterclockwise about the origin
  - 3) Reflection about the line  $y = -x$
- B.
- 1) Dilation by the scale factor of  $\frac{1}{2}$
  - 2) Rotation by  $90^\circ$  counterclockwise about the origin
  - 3) Reflection about the line  $y = x$
- C.
- 1) Dilation by the scale factor of 2
  - 2) Rotation by  $90^\circ$  clockwise about the origin
  - 3) Reflection about the line  $y = -x$
- D.
- 1) Dilation by the scale factor of 2
  - 2) Rotation  $90^\circ$  clockwise about the origin
  - 3) Reflection about the line  $y = x$

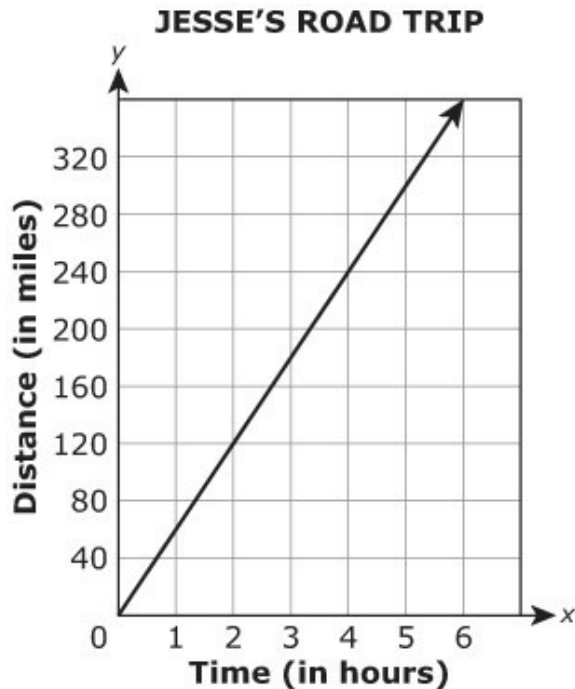
16. Bridget drew  $\triangle XYZ$  and  $\triangle X'Y'Z'$  on a coordinate plane, as shown below.



Which statement about the relationship between  $\triangle XYZ$  and  $\triangle X'Y'Z'$  is true?

- A.  $\triangle X'Y'Z'$  is a translation of  $\triangle XYZ$  because their corresponding sides are parallel.
- B.  $\triangle X'Y'Z'$  is NOT a translation of  $\triangle XYZ$  because not all points contained in  $\triangle X'Y'Z'$  have negative x-coordinates.
- C.  $\triangle X'Y'Z'$  is NOT a translation of  $\triangle XYZ$  because the y-coordinate of Point Z is not the same as the y-coordinate of point  $Z'$ .
- D.  $\triangle X'Y'Z'$  is a translation of  $\triangle XYZ$  because all points in  $\triangle X'Y'Z'$  are the same distance and direction from the corresponding points in  $\triangle XYZ$ .

17. Jesse and his brother Mark are each taking separate road trips. Jesse represents his speed on a graph, where  $y$  represents distance in miles and  $x$  represents time in hours.



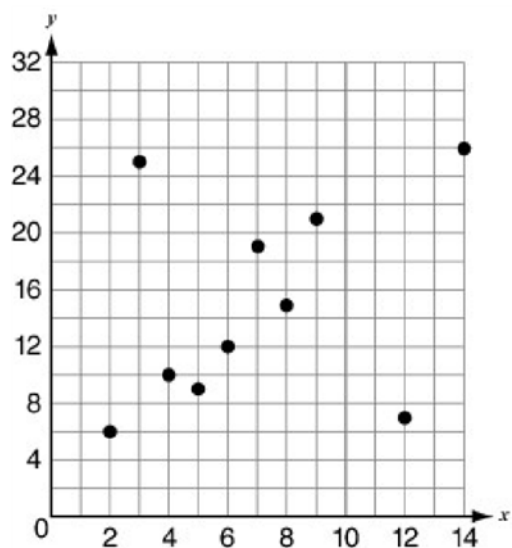
Mark represents his speed with an equation and defines his variables in the same way that Jesse did.

Mark's equation is  $y = 55x$ .

Part A. Write Jesse and Mark's speeds in miles per hour.

Part B. Justify your response for each speed.

18. Which equation **best** represents the data shown in the scatter plot below?



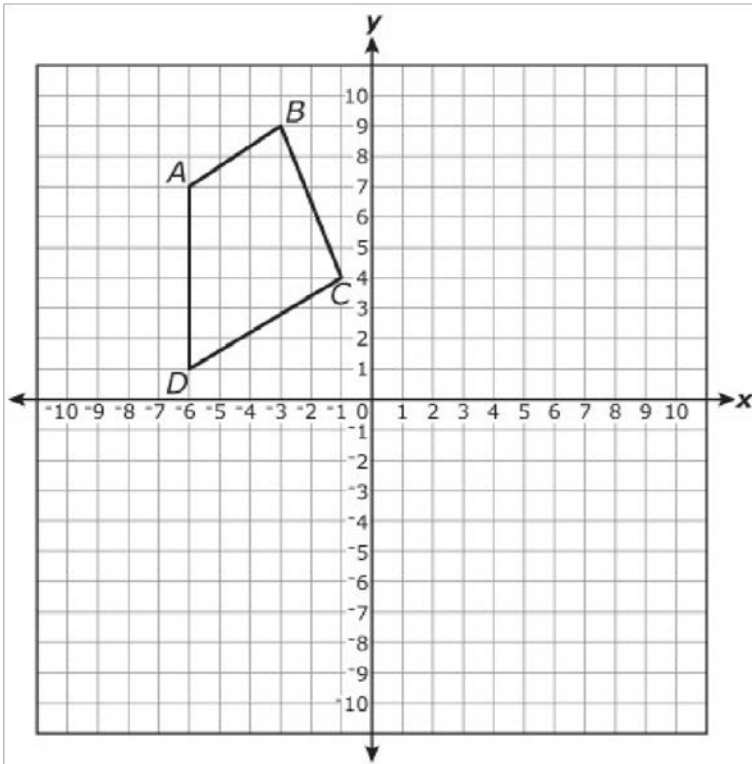
A.  $y = -x + 17$

B.  $y = \frac{3}{2}x + 3$

C.  $y = -2x + 31$

D.  $y = \frac{11}{3}x + 4$

19. Chad is studying transformations. He starts with quadrilateral  $ABCD$ .



He reflects  $ABCD$  across the  $y$ -axis and then rotates the image 90 degrees clockwise around the origin. What is the  $x$ -coordinate of Point  $D$  after the transformations?

20. Which of these correctly describes the solution(s) to the equation shown below?

$$\frac{7x + 21}{7} = \frac{2x - 6}{2}$$

- A. The equation has no solution.
- B. The equation has infinitely many solutions.
- C. The equation has one solution, which is  $x = 0$ .
- D. The equation has one solution, which is  $x = 3$ .

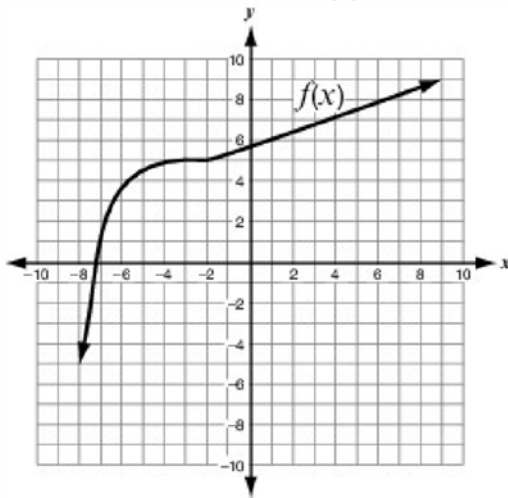
21. The owners of a building plan to hire a company to take care of the lawn maintenance for the building on a weekly basis. The owners get estimates from two different companies. They discover that Best Lawncare Services charges 1.5 times more for materials and equipment rentals than Anytime Landscaping Company does. They also determine that Anytime Landscaping Company charges 1.5 times more per hour for the weekly work than Best Lawncare Services does.

Part A. If Anytime Landscaping Company charges \$300 for materials and equipment rentals and Best Lawncare Services charges \$30 per hour for the weekly work done, for how many hours of work done per week will the charges for the two companies be the same and what will these charges be?

Part B. The building owners estimate that lawn maintenance will require 12 hours of work per week. If both companies do work of equal quality, at the prices provided in part A, which company should the building owners hire? Explain your answer.

Use words and/or numbers to show your work.

22. On which interval is  $f(x)$  linear?



- A. the interval between  $x = -8$  and  $x = -2$
- B. the interval between  $x = -2$  and  $x = \infty$
- C. the interval between  $x = -\infty$  and  $x = -2$
- D. the interval between  $x = -\infty$  and  $x = \infty$

23. Amber looks at the following system of equations.

$$y = -\frac{1}{2}x$$

$$y = \frac{1}{3}x$$

She concludes that because there is no  $y$ -intercept value, the lines cannot intersect.

Is Amber's conclusion correct? Explain your answer and support your reasoning with mathematical examples.