

Student Name: \_\_\_\_\_



# Mathematics Test Booklet Grade 8

## Paper-Based Item Sampler

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Alaska Department of Education & Early Development



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## Part 1

### Mathematics

Directions: Now you will be taking the mathematics portion of the Performance Evaluation for Alaska’s Schools. This test has two parts that contain different types of questions. Record all your answers in the answer document. Do not write in the test booklet.

Today, you will take Part 1 of the assessment. Calculators are NOT allowed in this part. The test will include questions that will ask you to provide your answer in a variety of ways.

- Most of the questions will have four answer choices and only one correct answer.
- Some questions have more than four answer choices and more than one correct answer. You will be asked to identify all the correct answers.
- Some questions will ask you to fill in your answer to provide your response. To fill in your answer, write your answer in the boxes at the top of the grid. Only one number or symbol is allowed in each box. Write mixed numbers as improper fractions. You may start anywhere. Fill in the bubble that matches the number or symbol at the top. See the examples in the pictures.

Answer $-3$ is shown here.	Answer $\frac{1}{2}$ is shown here.	Answer $.75$ is shown here.

Write your answers in the answer document. DO NOT WRITE YOUR ANSWERS IN THE TEST BOOKLET. All questions will be scored from answers in your answer document ONLY.

When you come to the word STOP at the end of Part 1, you have finished Part 1 of the mathematics assessment. You may review only Part 1 to check your answers. Make sure you have marked all your answers in the answer document clearly and that you have completely erased any marks you do not want. When you are finished, close your test booklet and answer document.

## Mathematics – Grade 8 Part 1

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1. Which value is an irrational number?

A. 4

B.  $\sqrt{5}$

C.  $\frac{2}{3}$

D.  $\sqrt{64}$

2. Which expression is equivalent to  $2^6 \times 2^{-3}$ ?

A.  $2^{-18}$

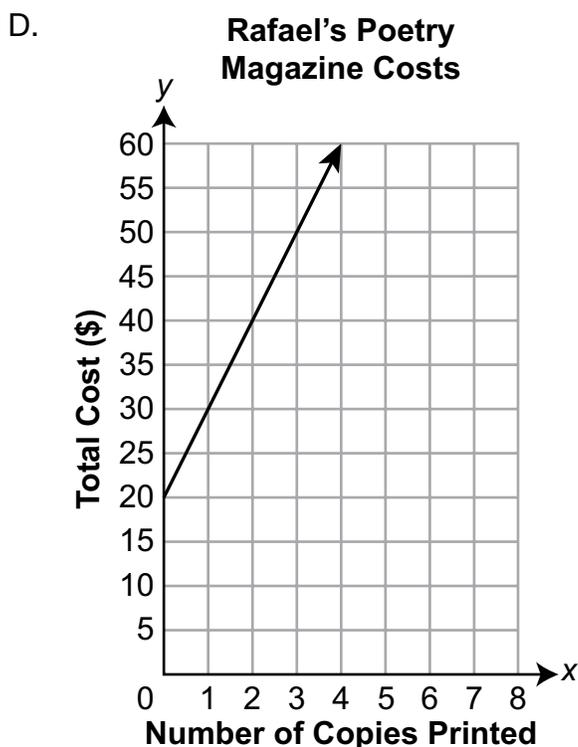
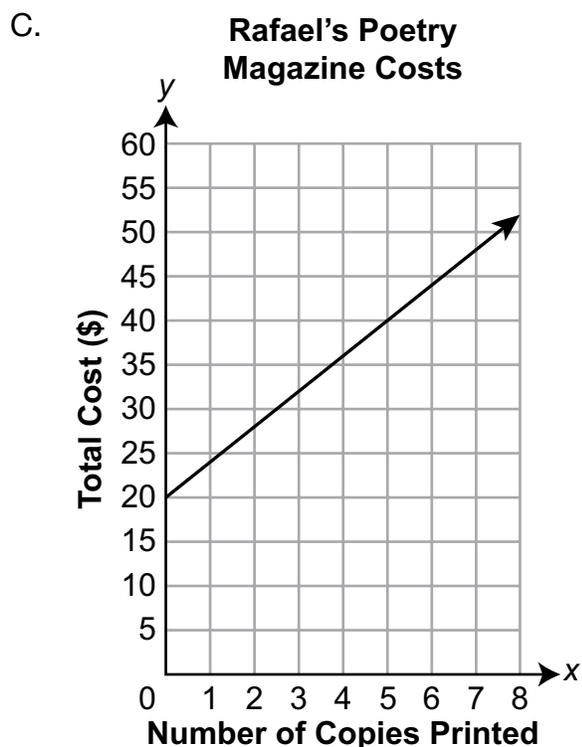
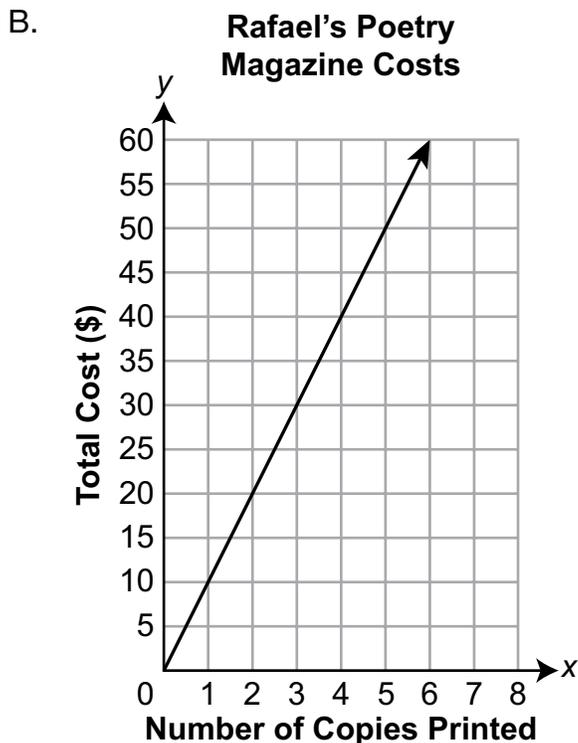
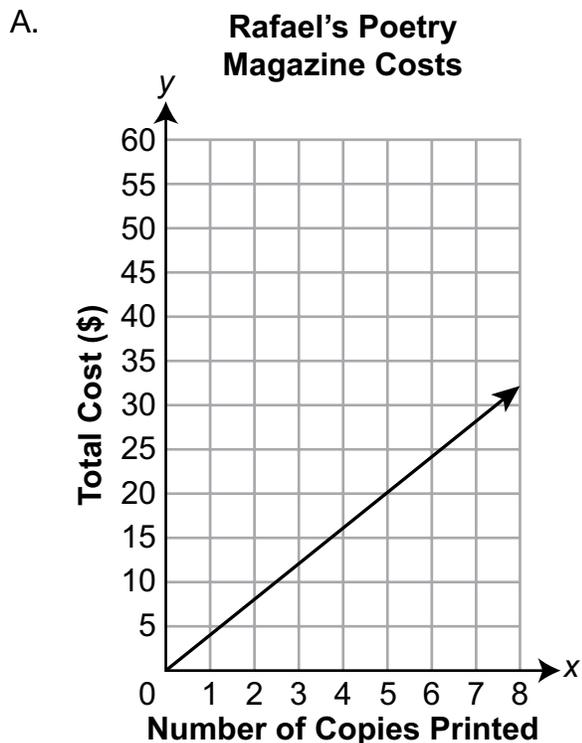
B.  $2^{-2}$

C.  $2^3$

D.  $2^9$

3. Rafael is publishing a poetry magazine. It costs him \$4 per copy to print the magazine. It also costs a flat fee of \$20 for delivery. To represent the total cost,  $y$ , in dollars, to print and deliver  $x$  copies of the magazine, Rafael writes the equation  $y = 4x + 20$ .

Which graph represents the total cost to print and deliver  $x$  copies of the magazine?



## Mathematics – Grade 8 Part 1

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4. What whole number is closest to  $\sqrt{13}$ ?

Enter your answer in the gridded response area on the answer document.

5. An equation is shown.

$$x^3 = 27$$

What is the value of  $x$ ?

Enter your answer in the gridded response area on the answer document.

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## Part 2

### Mathematics

Directions: Now you will be taking the mathematics portion of the Performance Evaluation for Alaska’s Schools. This test has two parts that contain different types of questions. Record all your answers in the answer document. Do not write in the test booklet.

Today, you will take Part 2 of the assessment. Calculators are allowed in this part. The test will include questions that will ask you to provide your answer in a variety of ways.

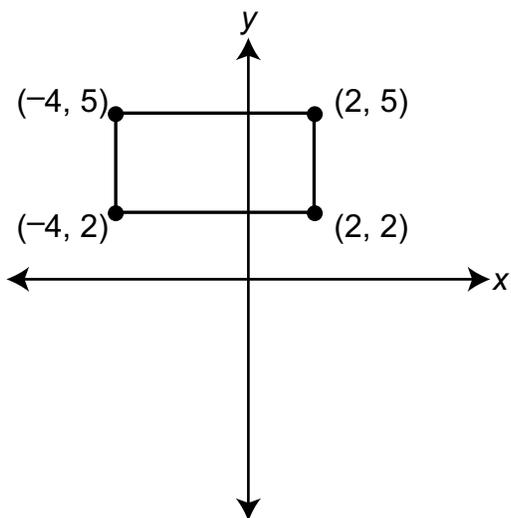
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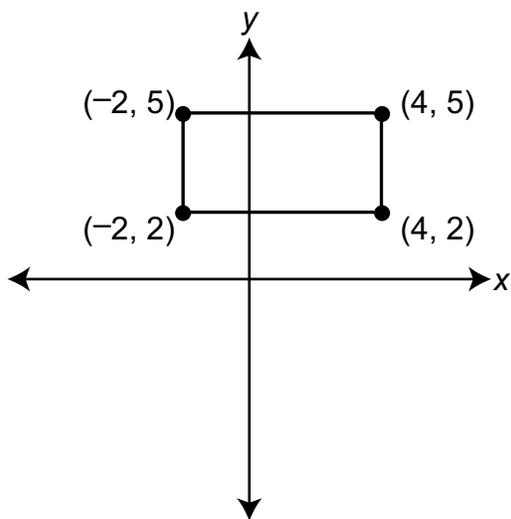
When you come to the word **STOP** at the end of Part 2, you have finished Part 2 of the mathematics assessment. You may review only Part 2 to check your answers. Make sure you have marked all your answers in the answer document clearly and that you have completely erased any marks you do not want. When you are finished, close your test booklet and answer document.

6. A rectangle is shown.

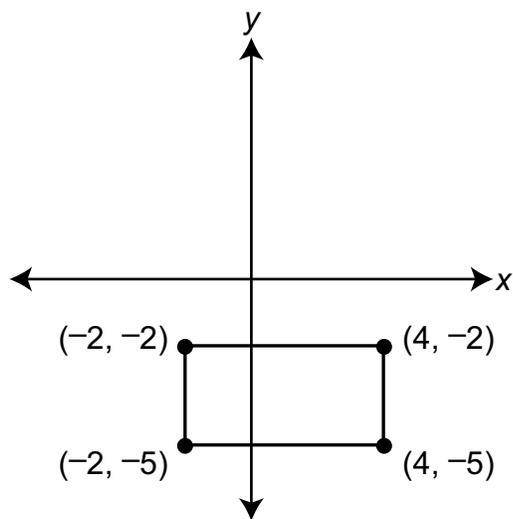


Which image shows the rectangle rotated 180 degrees about the origin?

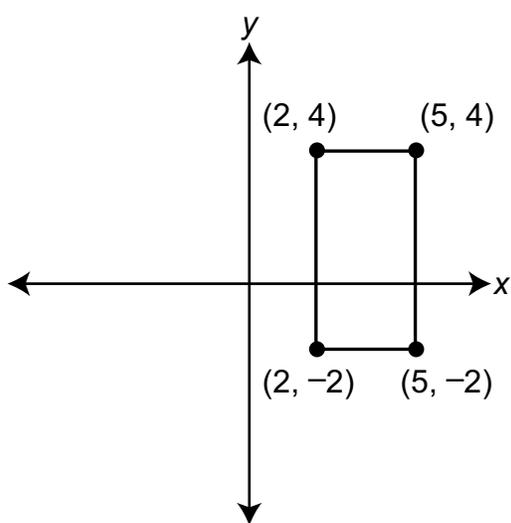
A.



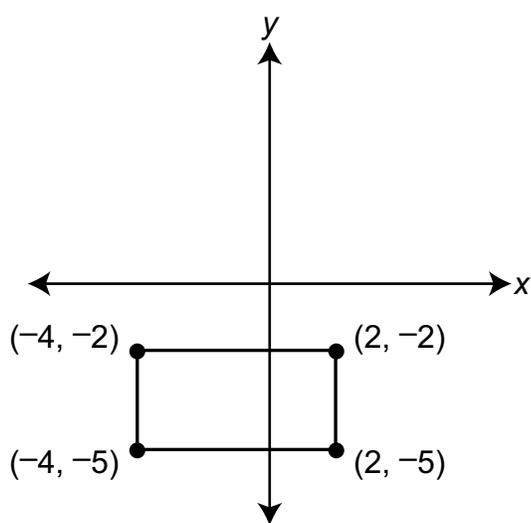
B.



C.



D.



**Mathematics – Grade 8 Part 2**

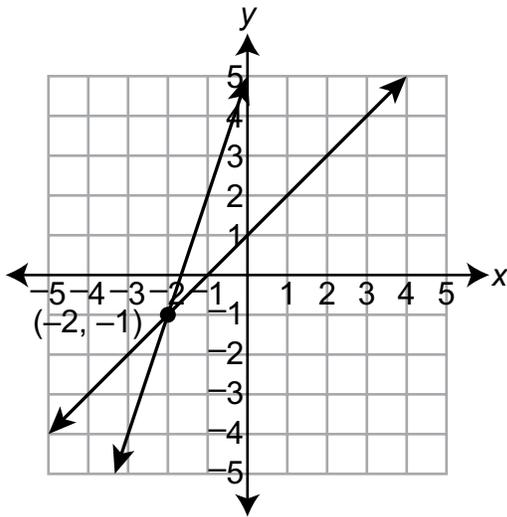
7. A system of linear equations is shown.

$$y = x + 1$$

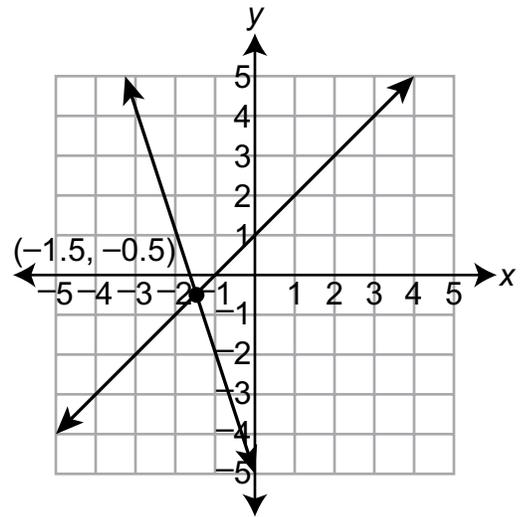
$$y - 3x = -5$$

Which graph shows the solution to the system of linear equations?

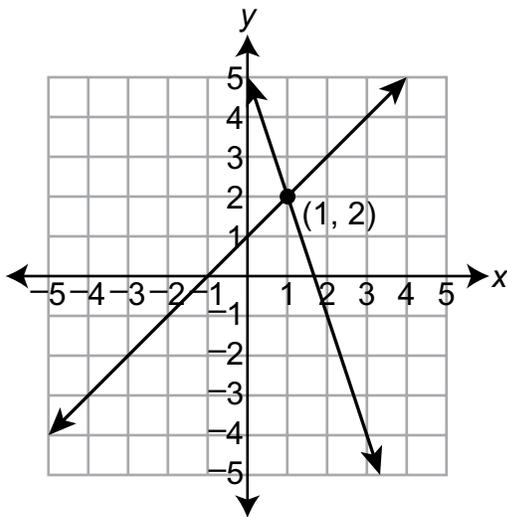
A.



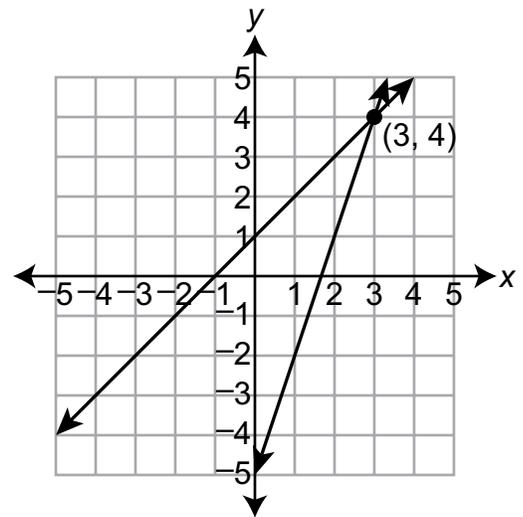
B.



C.



D.



8. Data regarding the number of hours of study and the score on a college entrance test were studied. The linear model that fits these data is  $y = 10 + 2x$ , where  $x$  is the number of hours of study and  $y$  is the test score.

What is the meaning of the slope and the  $y$ -intercept of this linear model?

- A. The score increases by 2 for each additional hour of study, and a score of 10 is the result of no hours of study.
- B. The score increases by 10 for each additional hour of study, and a score of 2 is the result of no hours of study.
- C. The score increases by 12 for each hour of study, and a score of 0 is the result of no hours of study.
- D. The score increases by 10 for every 2 hours of study, and a score of 0 is the result of no hours of study.

9. Three values of linear function  $f(x)$  are shown in the table.

$x$	$f(x)$
3	8
4	10
5	12

Which function has a greater  $y$ -intercept than the  $y$ -intercept of  $f(x)$ ?

- A.  $g(x) = 3x$
- B.  $g(x) = 2x + 2$
- C.  $g(x) = x - 15$
- D.  $g(x) = x + 3$

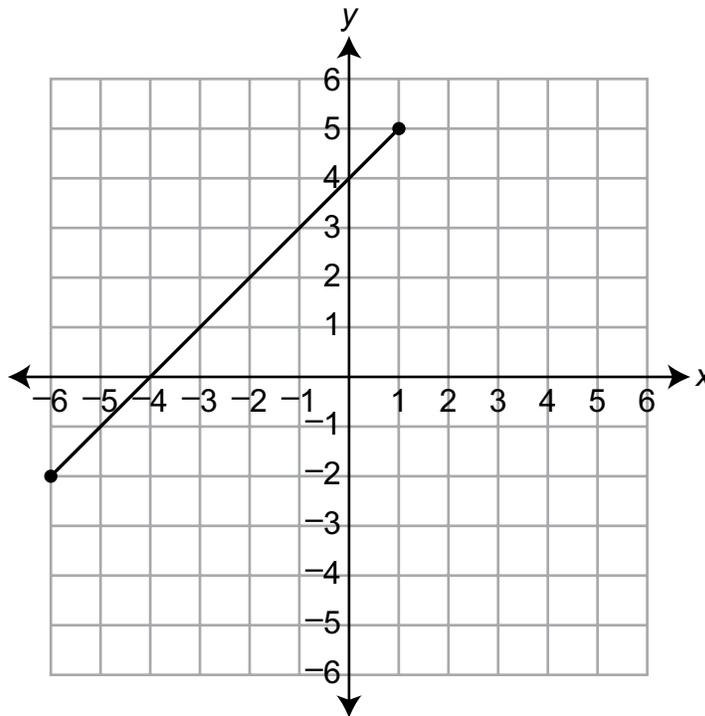
10. An equation is shown.

$$3x + 7 = 7 - 3x$$

What is the value of  $x$ ?

- A. 0
- B. 1
- C. no solution
- D. infinitely many solutions

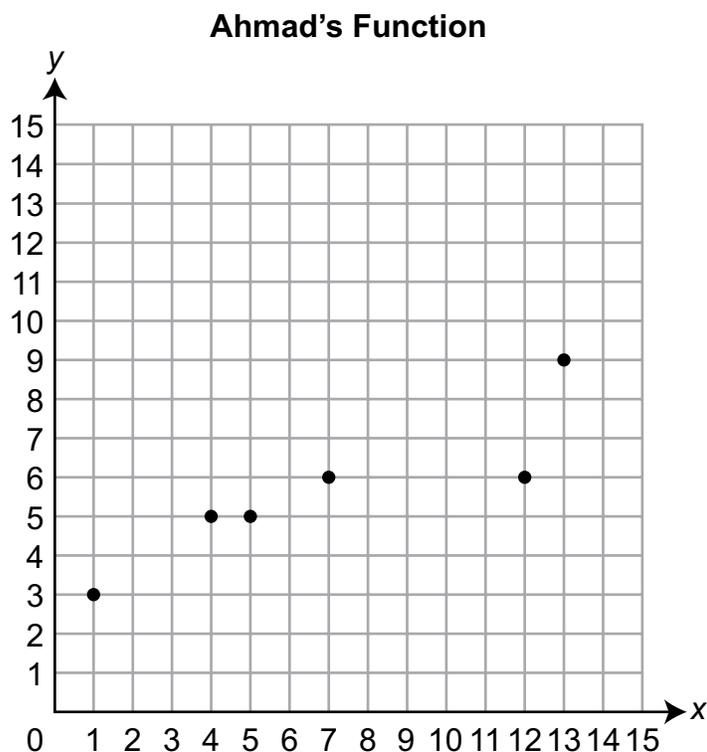
11. A graph of a line segment is shown.



The line segment is translated 2 units to the right and 3 units down. What are the coordinates of the new endpoints of the line segment?

- A. (-1, 8) and (-7, 1)
- B. (2, 3) and (-5, -3)
- C. (3, 2) and (-4, -5)
- D. (4, 3) and (-2, -4)

12. Ahmad creates a function that consists of 6 ordered pairs. He graphs the 6 points that represent his function on the coordinate plane as shown.

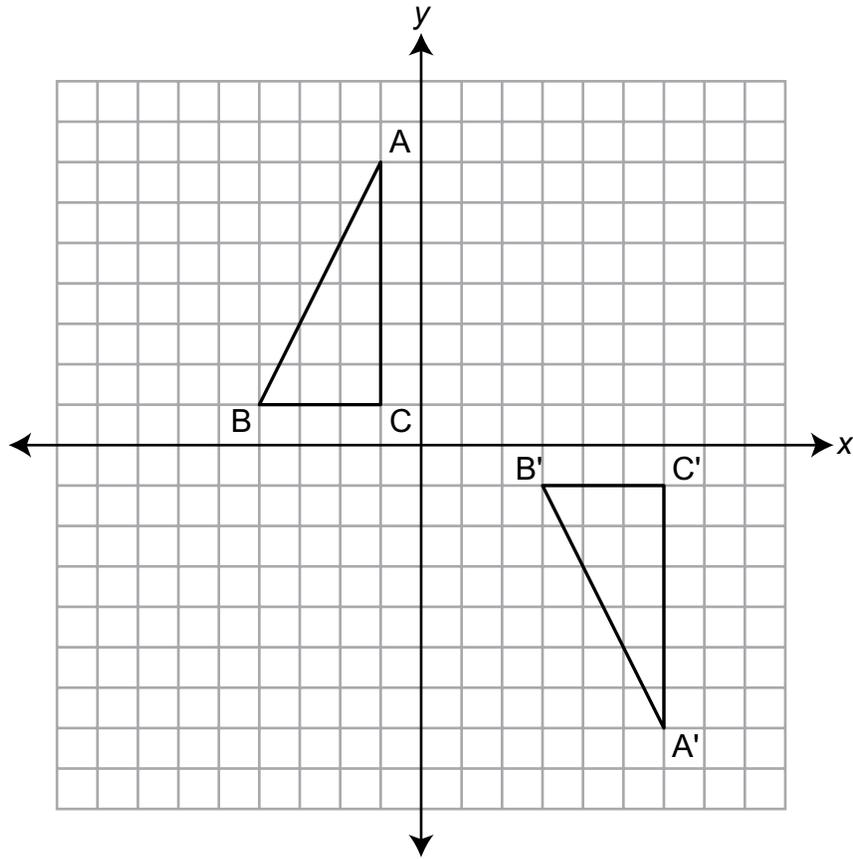


Ahmad then changes his function by removing 2 of the ordered pairs. His new function is a linear function.

Which ordered pair represents one of the points Ahmad removed from his function?

- A. (1, 3)
- B. (7, 6)
- C. (12, 6)
- D. (13, 9)

13. Triangle ABC and its congruent image A'B'C' are shown.

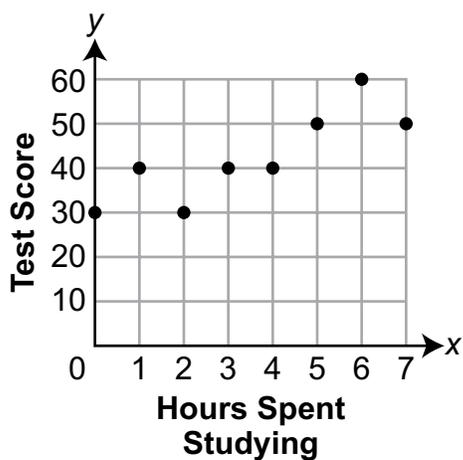


Which sequence correctly describes a way to map triangle ABC onto triangle A'B'C'?

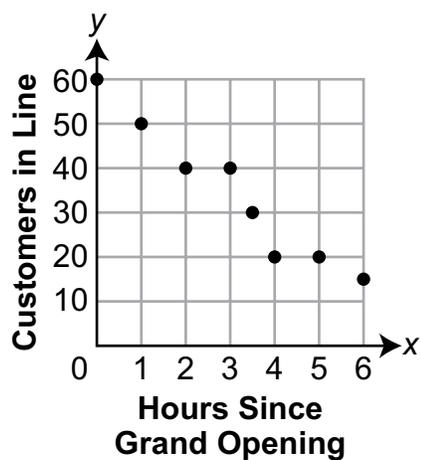
- A. Reflect triangle ABC over the  $x$ -axis, and then reflect it over the  $y$ -axis.
- B. Translate triangle ABC 7 units to the right, and then reflect it over the  $x$ -axis.
- C. Translate triangle ABC 7 units to the right, and then translate it 2 units down.
- D. Rotate triangle ABC 180 degrees about the origin, and then translate it 2 units to the right.

14. Which scatterplot shows a negative relationship between the two variables?

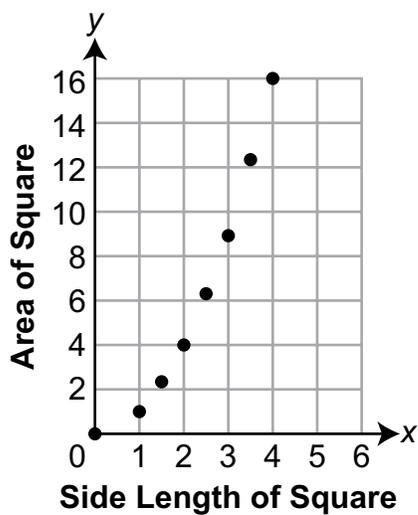
A.



B.



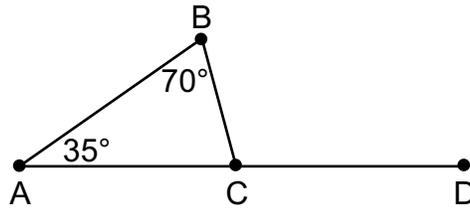
C.



D.



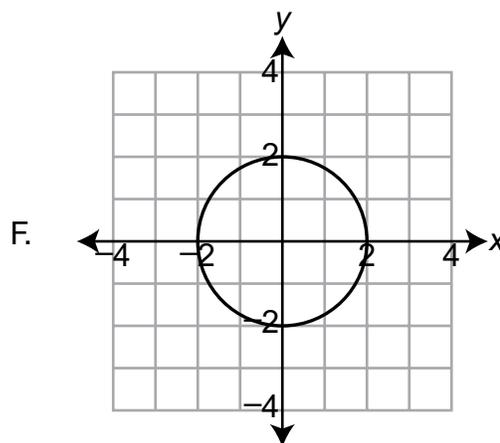
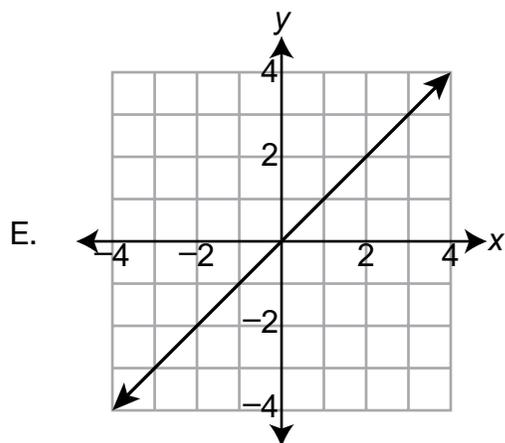
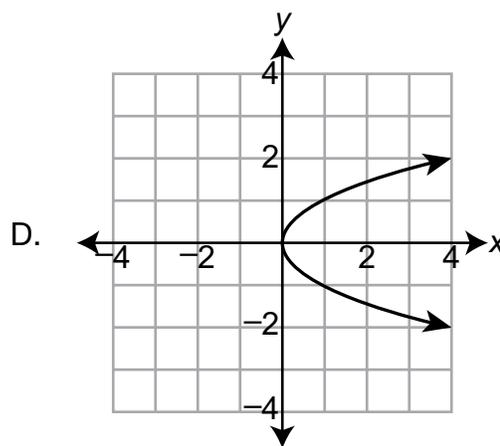
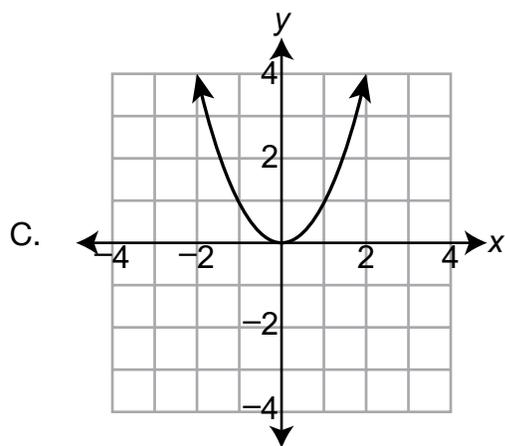
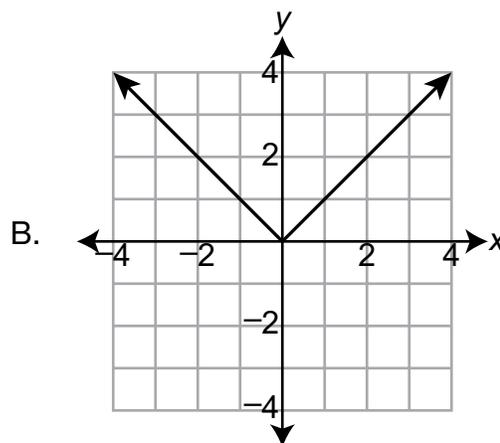
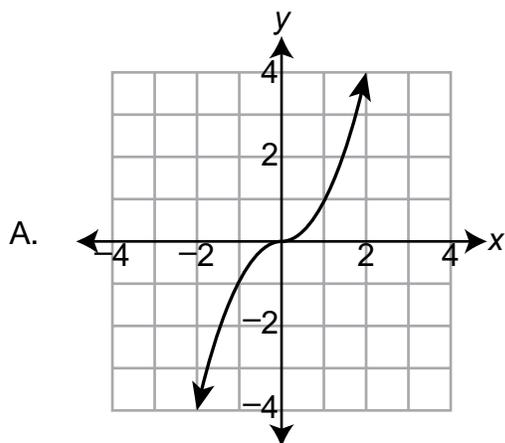
15. A triangle is shown, with angles A and B as marked.



Which statement is correct?

- A. The measure of angle DCB is 35 degrees because the base angles of the triangle are congruent.
  - B. The measure of angle DCB is 70 degrees because the angles are on the two sides of a transversal.
  - C. The measure of angle DCB is 75 degrees because the angle measures must add up to 180 degrees.
  - D. The measure of angle DCB is 105 degrees because it is the sum of the two remote interior angles.
16. Select ALL the examples that could be represented with a graph of a parabola.
- A. A football travels a certain path after the football is kicked.
  - B. The amount of gas in a car's gas tank changes during a 300-mile trip.
  - C. A stream of water travels a certain path when it sprays from a fire hose.
  - D. The amount of laundry soap remaining in a container decreases over time.
  - E. The distance a student is from home changes as the student walks to school.

17. Select ALL the graphs that are functions.



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