

**TEST NAME: Math Algebra 1 FAIM 2016 Form 1-A**

**TEST ID: 1549455**

**GRADE: Ninth Grade - Twelfth Grade**

**SUBJECT: Mathematics**

**TEST CATEGORY: State Interim Assessment**

**08/01/16, Math Algebra 1 FAIM 2016 Form 1-A**

Student:

Class:

Date:

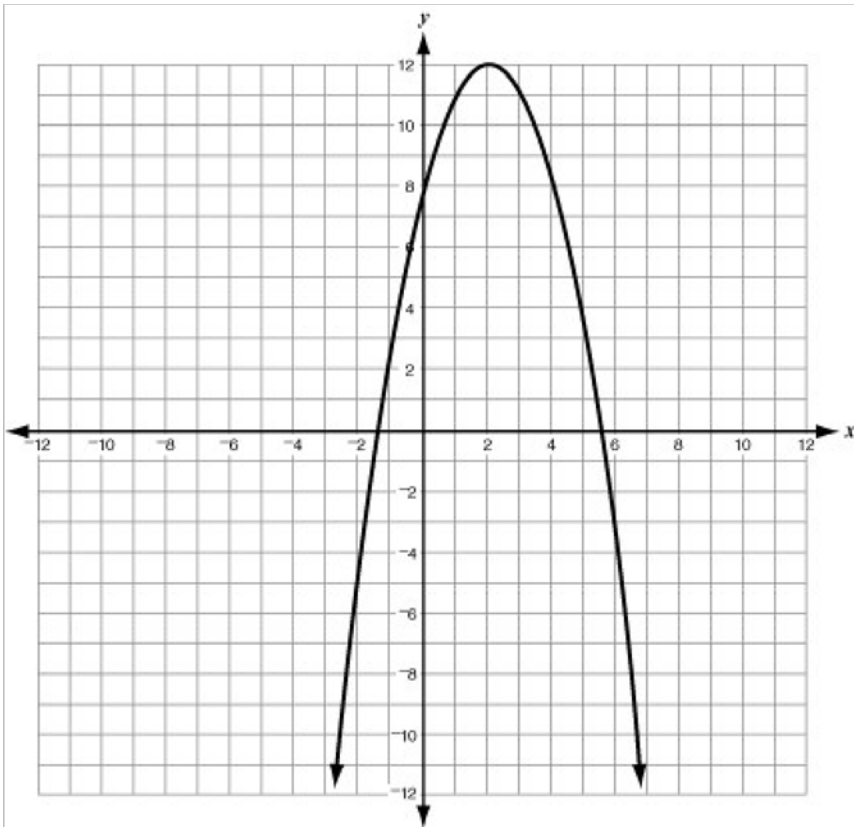
1. If the quadratic equation  $x^2 + 18x + 74 = 0$  rewritten in the form  $(x - p)^2 = q$ , what is the value of  $q$ ?

- A. -155
- B. -74
- C. 7
- D. 9

2. The weekly profit earned by a company after selling  $x$  items is given by the function  $p(x) = -0.5x^2 + 54x - 400$ . Which equation can be used to determine the number of items the company should sell to earn a profit of \$1058?

- E.  $\frac{1}{1058}(-0.5x + 4)(x - 100) = 0$
- F.  $\frac{1}{1058}(0.5x + 4)(x + 100) = 0$
- G.  $(-0.5x + 27)(x - 54) = 0$
- H.  $(0.5 + 27)(x + 54) = 0$

3. Use function  $g$ , shown in the graph below, and function  $f(x) = -x^2 + 4x + 6$  to answer the question.



What is the positive difference between the **maximum** values for functions  $g$  and  $f$ ?

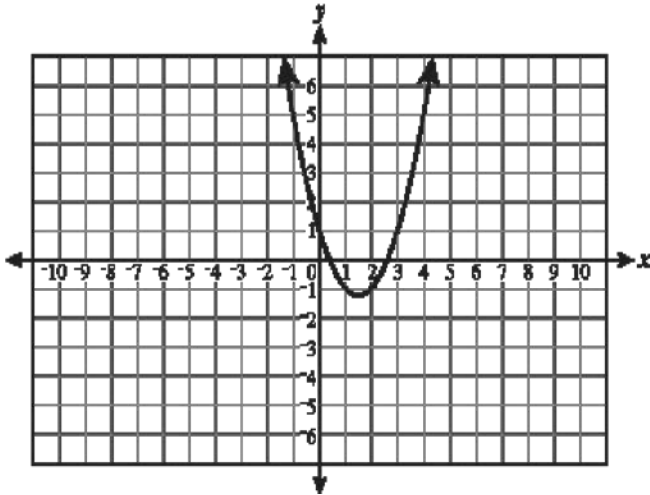
4. Which set of data would **most likely** represent a positive correlation and a causation?
  - A. the height of students in a class and their shoe size
  - B. the time spent swimming and the number of calories burned by a particular person
  - C. the number of cars registered in large U.S. cities and the number of high-rise buildings in those cities.
  - D. the number of hours students spend watching cartoons and the students' test scores
  
5. Alloy C, weighing 500 ounces and having 35% aluminum, is obtained from melting together  $x$  ounces of alloy A, containing 25% aluminum, and  $y$  ounces of alloy B, containing 40% aluminum. Write an equation showing the ounces of alloy A and alloy B that can be used to obtain alloy C.

6. The graph of the quadratic function  $f$  is such that its two zeros are on the opposite sides of the  $y$ -axis and are two units apart. If  $f(x) = (x + a)(x + b)$  represents the factored form of the function, which statement could be true?
- A.  $a > 0, b < 0$  and  $a - b = 2$
  - B.  $a > 0, b < 0$  and  $b - a = 2$
  - C.  $a > 0, b > 0$  and  $a - b = 2$
  - D.  $a < 0, b < 0$  and  $b - a = 2$
7. Find all real values of  $x$  such that  $-2x^2 + 3x = 1$ . Show your work.
8. Which is a true statement about the rates of change of the functions  $f(x) = 3x$  and  $g(x) = 3^x$ ?
- A. For every unit  $x$  increases, both  $f(x)$  and  $g(x)$  triple in quantity.
  - B. For every unit  $x$  increases, both  $f(x)$  and  $g(x)$  increase by 3 units.
  - C. For every unit  $x$  increases,  $f(x)$  triples in quantity and  $g(x)$  increases by 3 units.
  - D. For every unit  $x$  increases,  $f(x)$  increases by 3 units and  $g(x)$  triples in quantity.
9. If  $f(x) = x^2 + 5x - 12$ , what is the value of  $f(-3)$ ?
10. The total commission, in dollars, Jessie earned on selling cars at a dealership in two weeks is given by the expression  $800 + 400x$ . She earns the same amount of commission per car each week. Which situation could be described by this expression?
- A. Jessie earned a total commission of \$800 in the first week and  $x$  dollars in the second week.
  - B. Jessie sold 2 cars in the first week and  $x$  number of cars in the second week, earning a commission of \$400 on each car.
  - C. Jessie sold 1 car in the first week, earning \$800, and  $x$  number of cars in the second week, earning a total commission of \$1,200.

d. Jessie earned a commission of \$800 on each car in the first week and \$400 on each car in the second week, selling  $x$  number of cars each week.

11. Which quadrant contains no solutions to the inequality  $y > 2x + 4$ .

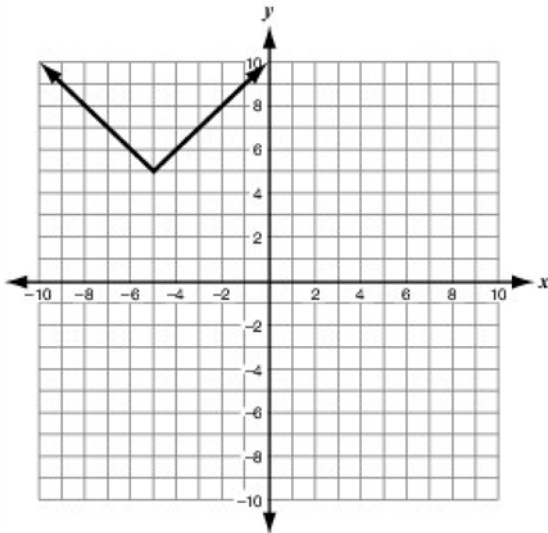
12. The graph of the function  $f$  is shown below.



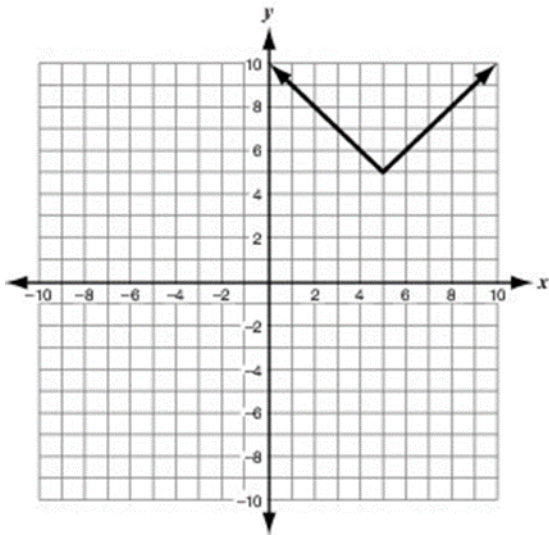
Determine  $f(4)$ .

13. Which graph below shows the graph of an absolute value function that is decreasing over the interval  $(-\infty, -5)$  and increasing over the interval  $(-5, \infty)$ ?

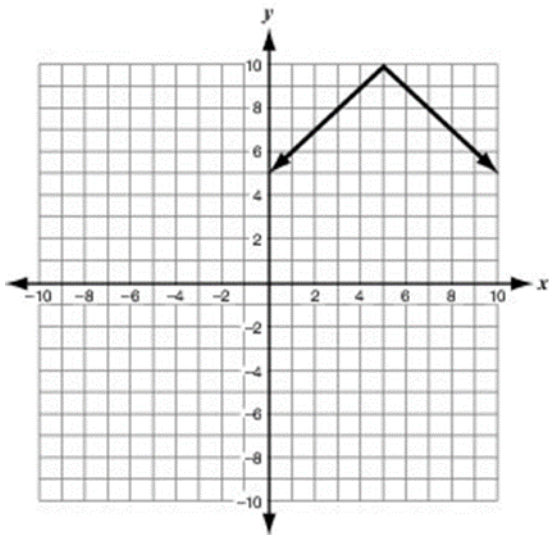
A.



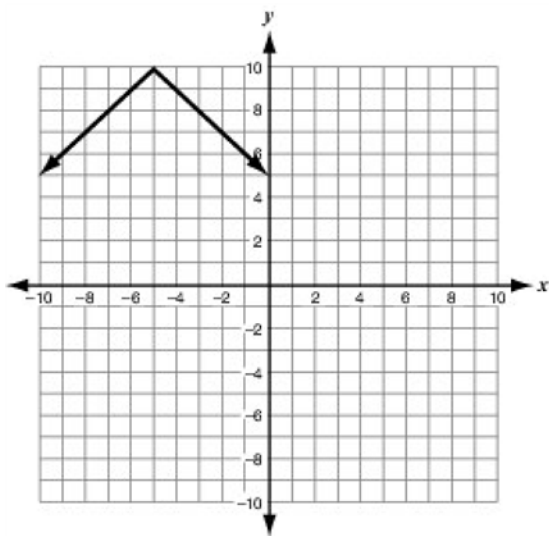
B.



C.



D.

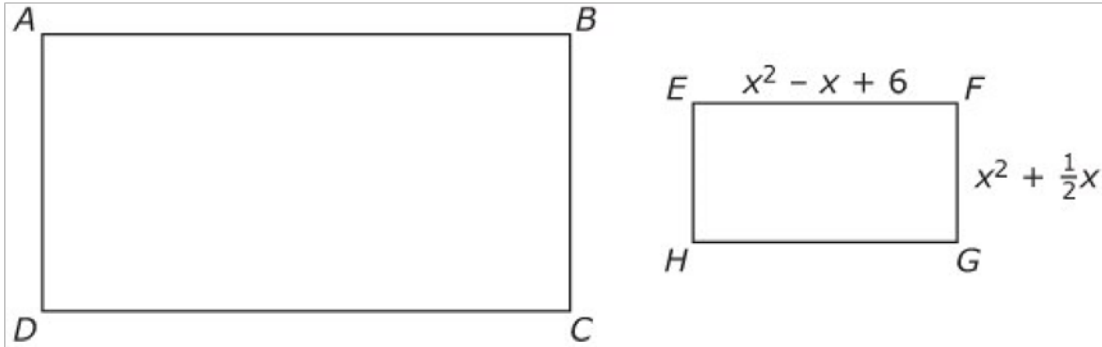


14. List the steps to solve this equation.

$$2(3x - 5) = 8$$

Justify each step by identifying the mathematical property used.

15. The perimeter of rectangle  $ABCD$  is four times greater than the perimeter of rectangle  $EFGH$ .

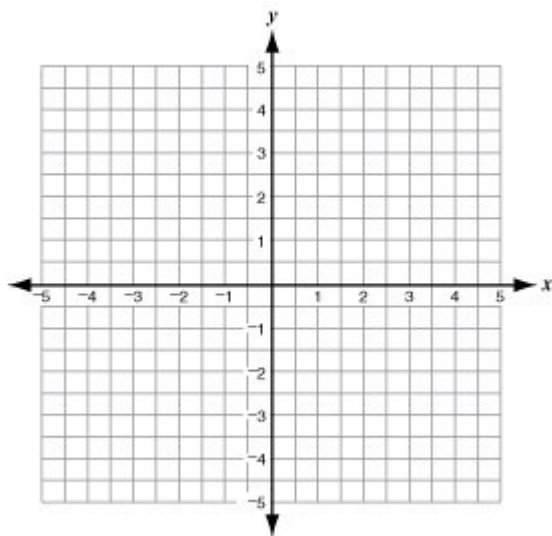


What is the perimeter of  $ABCD$ ?

- A.  $4x^2 - x + 12$
- B.  $4x^2 - x + 16$
- C.  $8x^2 - 2x + 24$
- D.  $16x^2 - 4x + 48$
16. Two hot-air balloons at a fair fly on parallel paths, both rising and falling. At one point, they are at precisely the same height. From that instant and for 80 seconds afterwards, the functions  $f(t) = -15t + 1200$  and  $g(t) = 28t + 1200$  describe the altitudes (in feet) of the balloons  $t$  seconds after they are at the same height. Write a function,  $A$ , that represents the difference in altitude of the hot-air balloons  $t$  seconds after they pass one another, where  $0 \leq t \leq 80$ .
17. The members of the Drama Club sold their old costumes in a booth at the school craft fair. Their profit was the difference between the amount of money they made selling the costumes and the cost of the booth. The cost of the booth was \$50 and each of the costumes was sold for the same price. After the members of the Drama Club had sold 9 costumes, they had made a profit of \$62.50. The function

$p$  represents the Drama Club's profit as a function of  $c$ , the number of costumes they sold. What does the  $c$ -intercept of the function represent?

- A. The  $c$ -intercept represents a profit of \$0 when 4 costumes are sold.
  - B. The  $c$ -intercept represents a profit of \$12.50 when 5 costumes are sold.
  - C. The  $c$ -intercept represents a loss of \$50 when no costumes are sold.
  - D. The  $c$ -intercept represents a loss of \$37.50 when 1 costume is sold.
18. At what point does the graph of the function  $f(x) = x^2 + 6x + 8$  have a minimum value?

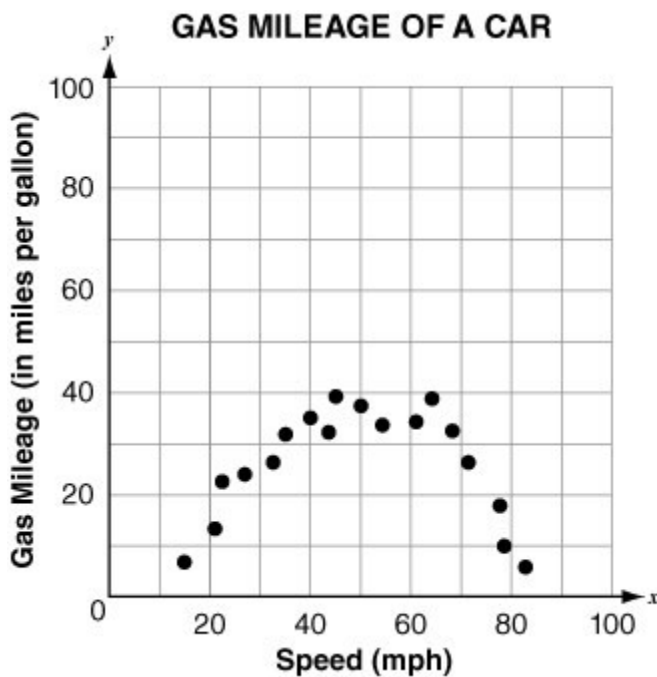


19. The volume,  $V$ , of a pyramid with a rectangular base is given by the formula,  $V = \frac{1}{3}lwh$ , where  $l$  is the length of the base,  $w$  is the width of the base, and  $h$  is the height of the pyramid. Which expression represents the value of  $h$  in terms of  $V$ ,  $l$ , and  $w$ ?
- A.  $\frac{3}{lw}$
  - B.  $\frac{3V}{lw}$
  - C.  $\frac{Vlw}{3}$



D.  $\frac{V}{3lw}$

20. John had a math assignment to complete during his midterm break. He completed one question on the first day, three questions on the second day, and seven questions on the third day. He followed the same pattern every day until he completed the assignment on the sixth day. Write a recursive rule to model the number of questions that John solved each day after the first.
21. The graph below represents the gas mileage, in miles per gallon, of a car at different speeds.



If  $x$  denotes the speed and  $y$  denotes the mileage per gallon, which equation best represents the relationship between the speed of the car and fuel efficiency?

- A.  $y = 0.025x^2 - 2.5x - 25$
- B.  $y = 0.025x^2 + 2.5x + 25$
- C.  $y = -0.025x^2 + 2.5x + 25$
- D.  $y = -0.025x^2 + 2.5x - 25$

22. Sharon and Lacy are track and field athletes for their high school. Sharon is a sprinter (someone skilled in running very fast for a short period of time) and runs the 200meter race in 32 seconds. Lacy is a middle-distance runner (someone skilled in maintaining good speed over a much longer distance) and runs the mile (1,609 meters) in 5 minutes and 43 seconds.

Part A

Michael asks, "Assuming that Sharon and Lucy maintain those rates of speed, which of them is the faster athlete?" Answer Michael's question, using common unit rates.

Part B

Sharon and Lacy are going to run a quarter-mile race, longer than Sharon trains to run, but only half of Lucy's usual distance. Using the common unit rates from Part A, Michael determines the margin of victory, in seconds, for the winner. What should his answer be?

Part C

Explain whether it is reasonable for Michael to use the common unit rates from Part A to compare a sprinter and a middle-distance runner when predicting the winner for the quarter-mile race.