

## April HW – Cumulative Review AIR Practice

### Problem #33 Ohio Practice Test #17

An equation is shown.

$$2x^2 - 5x - 3 = 0$$

What values of  $x$  make the equation true?

$x =$

$x =$

### Problem #34

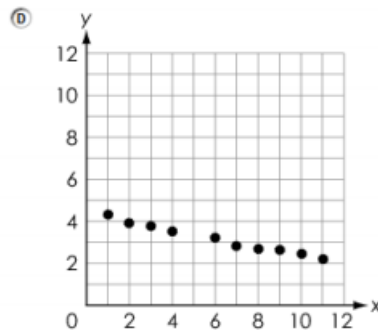
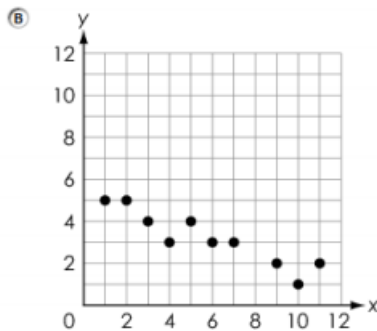
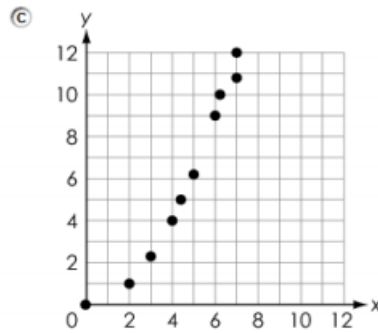
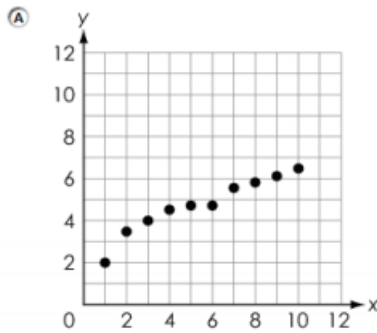
The area,  $A$ , of a rectangular parking lot is given by the equation  $A = 16s^2 + 25$ . Jacob knows the area of the parking lot and wants to find  $s$ . Solve  $A = 16s^2 + 25$  for  $s$ .

Enter your answer in the space provided. Enter **only** your answer.

$s =$

### Problem #35 Ohio 2017 #4

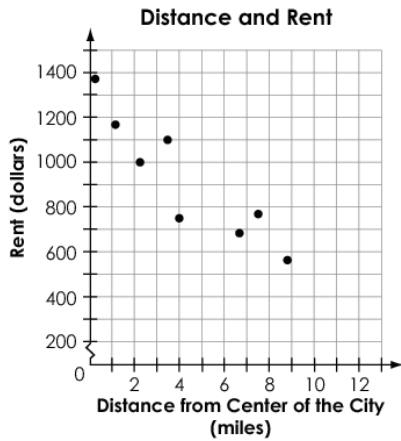
Which scatterplot represents the data that would be best modeled by a quadratic function?



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### Problem #36 Ohio Practice Test

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Juan wants to rent a house. He gathers data on many similar houses. The distance from the center of the city,  $x$ , and the monthly rent for each house,  $y$ , are shown in the scatter plot. Juan models the data with a linear equation.

Based on the scatter plot, what could the number 1275 represent in his equation?

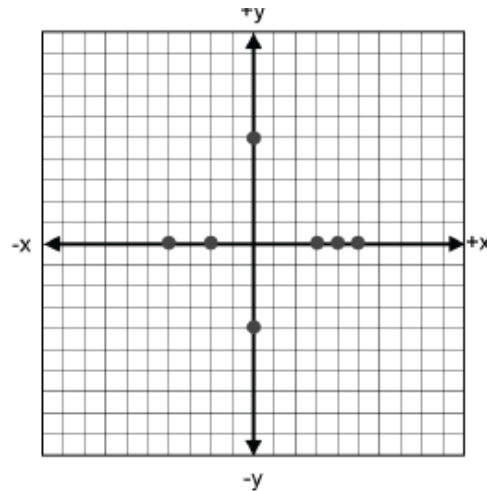
- (A) The estimated rent for a house in the center of the city
- (B) The estimated minimum rent for a house far from the center of the city
- (C) The estimated change in rent for each additional mile from the center of the city
- (D) The estimated change in distance from the center of the city for each dollar change in rent

### Problem #37

Which of the plotted points represent the zeros of the function  $f(x) = (x^2 - 3x - 10)(x + 4)$  ?

CIRCLE all that apply.

- A) (3,0)
- B) (5,0)
- C) (0,-4)
- D) (-2,0)
- E) (-4,0)
- F) (4,0)
- G) (0,5)



### Problem #38

Let  $a$  represent a non-zero rational number and  $b$  represent an irrational number.

Which expression could represent a rational number?

CIRCLE all that apply.

- A)  $-b$
- B)  $a - b$
- C)  $b^2$
- D)  $ab$
- E)  $a + b^2$
- F)  $2b$

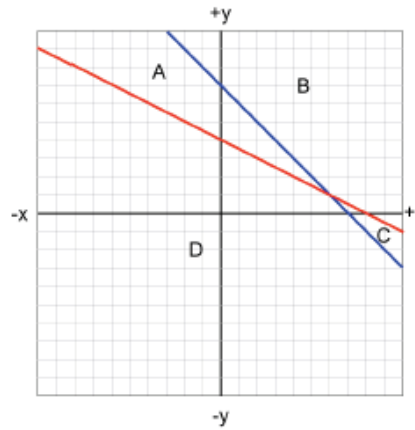
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**Problem #39**

Identify the region that solves the system of inequalities represented by

$$\begin{aligned}x + y &\leq 7 \\ x + 2y &\geq 8\end{aligned}$$

- A) A
- B) B
- C) C
- D) D
- E) A and B
- F) C and D



**Problem #40**

The formula for the yearly depreciation,  $D$ , for an item in terms of its cost,  $C$  and its salvage value,  $S$  and the number of years,  $n$  is given

$$D = \frac{(C - S)}{n}$$

Which formula shows how the cost,  $C$ , can be determined from the salvage value,  $S$  the depreciation,  $D$  and the time,  $n$  ?

- A)  $C = Dn + S$
- B)  $C = Dn - S$
- C)  $C = Sn + D$
- D)  $C = DS + n$

**Problem #41** Ohio Practice Test #12

A linear model shows that the relationship between the number of grocery items purchased and the total cost of the grocery bill has a correlation coefficient of 0.97.

Which statement about the variables is true?

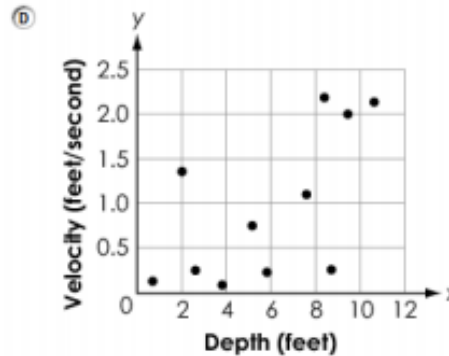
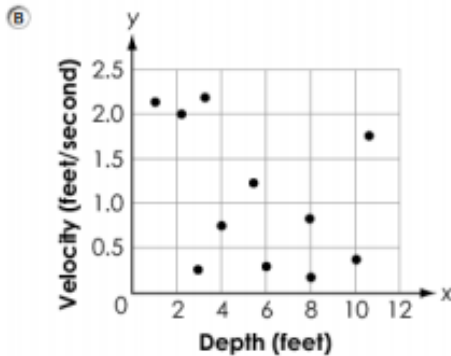
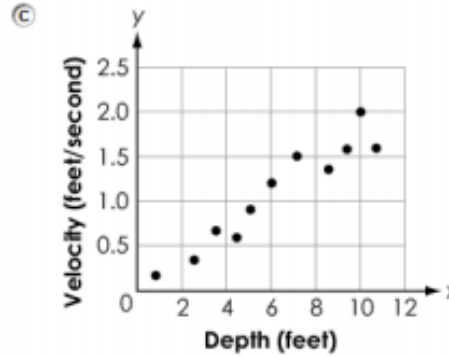
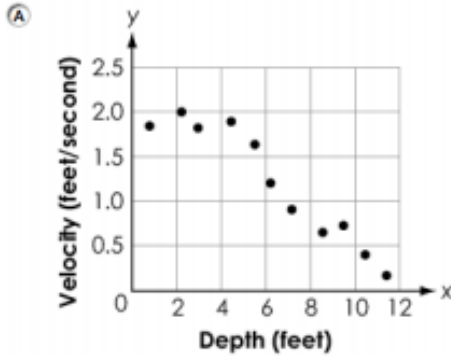
- Ⓐ Purchasing more items causes a higher cost of the grocery bill.
- Ⓑ If a grocery bill has a higher cost, then more items must have been purchased.
- Ⓒ There is no relationship between the number of items purchased and the total cost of the grocery bill.
- Ⓓ There is a strong relationship between the number of items purchased and the total cost of the grocery bill.

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**Problem #42** Ohio 2017 #10

Bryson collects data on the depth of a river at various points and the velocity of the river at those points. His data have a correlation coefficient of  $-0.9382$ .

Which scatterplot could represent Bryson's data?



**Problem #43** Ohio 2017 #12

Which correctly factored form of the function  $f(x) = 36x^2 + 15x - 6$  can be used to identify the zeros?

- (A)  $f(x) = (4x - 1)(3x + 2)$
- (B)  $f(x) = (12x - 2)(3x + 3)$
- (C)  $f(x) = 3(4x - 1)(3x + 2)$
- (D)  $f(x) = 3(12x - 2)(3x + 3)$

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#### **Problem #44** Ohio Practice Test #21

A grasshopper jumps off of a tree stump. The height, in feet, of the grasshopper above the ground after  $t$  seconds is modeled by the function shown.

$$h(t) = -t^2 + \frac{4}{3}t + \frac{1}{4}$$

After how many seconds will the grasshopper land on the ground?

#### **Problem #45**

The number of miles a car can be driven depends on the number of gallons of gas in its tank. The function  $m = 25g$  models a situation in which a car gets 25 miles per gallon. If the gas tank holds 20 gallons of gas, which inequality represents its range?

- A.  $0 \leq g \leq 20$
- B.  $0 \leq m \leq 500$
- C.  $m \leq 500$
- D.  $g \leq 20$

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#### **Problem #46**

Vincent goes to the gym for 30 minutes every day. He starts a new exercise routine on a Monday and uses a function to model the amount of calories he has used,  $f(d)$ , as a function of the number of days,  $d$ , he has exercised with the new routine.

Which statement represents a correct interpretation of  $f(d)$ ?

- A.  $f(5) = 150$  means Vincent has exercised for a total of 150 minutes after the fifth day of exercising with his new routine
- B.  $f(10) = 3,500$  means Vincent will use 3,500 calories on day 10 of exercising with his new routine.
- C.  $f(15) = 5,250$  means after 15 days of exercising with his new routine, Vincent has used 5,250 calories.
- D.  $f(30) = 10,500$  means the number of calories Vincent has used times 30 is equal to 10,500.

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#### **Problem #47**

Given two equations of lines:

$$y = -\frac{1}{4}x + 2 \quad \text{and} \quad -2y = \frac{1}{2}x - 4$$

How do the lines compare?

- A. They are different lines with the same slope.
  - B. They are different lines with the same y-intercept.
  - C. They are the same line, both with a slope of  $\frac{1}{2}$  and a y-intercept of -4
  - D. They are the same line, both with a slope of  $-\frac{1}{4}$  and a y-intercept of 2.
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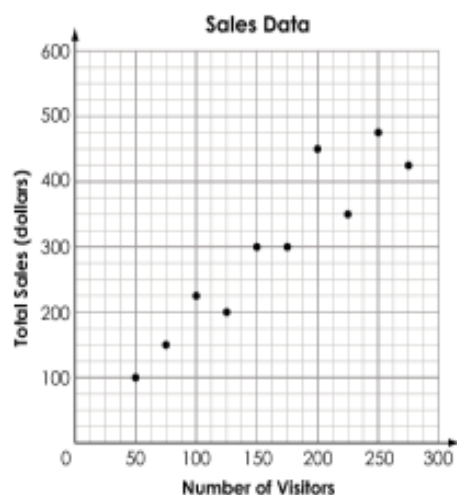
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**Problem #48**

In the  $xy$ -coordinate plane, the graph of the equation  $y = 3x^2 - 12x - 36$  has zeros at  $x = a$  and  $x = b$ , where  $a < b$ . The graph has a minimum at  $(c, -48)$ . What are the values of  $a, b$ , and  $c$ ?

- A.  $a = 2, b = 4, c = 2$
- B.  $a = -2, b = 6, c = 2$
- C.  $a = -31, b = 31, c = 0$
- D.  $a = 3, b = 6, c = 2$

**Problem #49** Ohio 2017 #6



A store manager records the total visitors and sales, in dollars, for 10 days. The data are shown in the scatter plot.

What conclusion can the store manager draw based on the data?

- (A) An increase in sales causes a decrease in visitors.
- (B) An increase in visitors causes an increase in sales.
- (C) An increase in sales is correlated with a decrease in visitors.
- (D) An increase in visitors is correlated with an increase in sales.

**Problem #50** Ohio Practice Test #22

An equation of a function  $y(t)$  is shown.

$$y(t) = -t^2 + 14t - 40$$

Select all of the statements that are true about the graph of  $y(t)$  for  $6 \leq t \leq 8$ .

- The value of  $y(t)$  increases over the interval  $6 \leq t \leq 7$ .
- The value of  $y(t)$  increases over the interval  $7 \leq t \leq 8$ .
- The average rate of change over the interval  $6 \leq t \leq 8$  is 0.
- The value of  $y(t)$  is constant over the interval  $6 \leq t \leq 8$ .
- The average rate of change over the interval  $6 \leq t \leq 7$  is the same as the average rate of change over the interval  $7 \leq t \leq 8$ .

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**Problem #51**

Meghan is constructing a table that satisfies the definition of a function.

x	-4	10	2	-6	7	3	1	
f(x)	5	14	-2	5	-1	0	10	-2

Which number(s) can be entered in the empty cell of the table so that the table of values satisfies the definition of a function? Select all that apply.

- A) 4
  - B) 7
  - C) -2
  - D) 5
  - E) 1
- 

**Problem #52**

The elk population in Rock Creek, Montana is represented by the expression

$$1644 (.96)^x$$

where x represents the number of years since 2010.

Which of the following statements are true?  
Select all that apply.

- A) The population has increased since 2010.
- B) The population has decreased since 2010.
- C) The number of elk in 2010 was 96.
- D) The number of elk in 2010 was 1644.
- E) The number of elk will increase by 96% each year.

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### **Problem #53**

A skate park charges \$5 per person to skate during a special session on Saturday mornings. The park can allow no more than 50 people for this session.

The function  $S(n) = 5n$  represents the amount of money the park takes in on Saturday morning, where  $n$  is the number of skaters.

What is the domain of  $S(n)$  in this context?

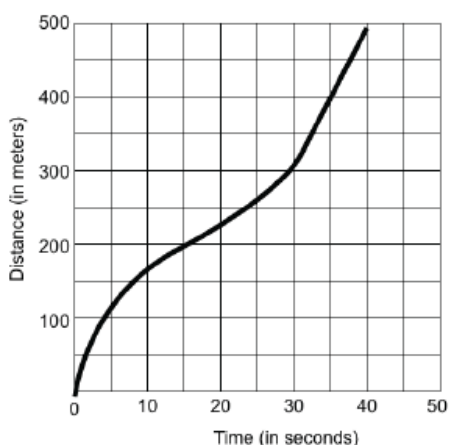
- A) all whole numbers
- B) all non-negative rational numbers
- C) all non-negative integers that are less than or equal to 50
- D) all non-negative integers less than or equal to 250

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### **Problem #54**

The graph shows the distance given the time for a runner in a 500 meter race. According to the graph, what is the average speed (rate of change) for the runner from 15 to 35 seconds?

- A) 8 m/s
- B) 10m/s
- C) 11.4 m/s
- D) 13.3 m/s



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### **Problem #55**

The number of deer in a wildlife preserve increases exponentially.

The situation can be modeled by the function

$$N(t) = ab^t$$

where  $a$  and  $b$  are constants and  $t$  is time in months.

$t$	$N(t)$
0	45
1	90

The table shows two values of the function.

Which of the statement(s) are true for this function?

- A) The value of  $a$  is 45.
  - B) The value of  $a$  is 90.
  - C) The value of  $b$  is 2.
  - D) The value of  $b$  is 45
  - E) The value of  $b$  is 90.
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**Problem #56**

Which of the following statements is true for the expression

$$5x^2 + 3x + 14 ?$$

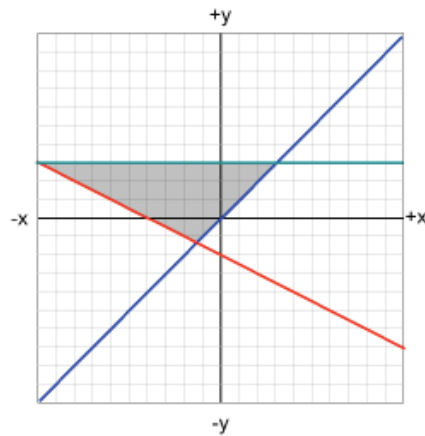
- A) The coefficient of  $x$  is 5.
- B) The coefficient of  $x^2$  is 5.
- C) The constant term is 14.
- D) The constant term is  $5x^2$ .
- E) The expression has 5 terms.
- F) The expression has 3 terms.

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**Problem #57**

Which inequalities belong to the system represented by the graph.  
Select all that apply.

- A)  $x - y \leq 0$
- B)  $x - y \geq 0$
- C)  $x + 2y \geq -4$
- D)  $x + 2y \leq -4$
- E)  $y \leq 3$
- F)  $y \geq 3$



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**Problem #58**

The vertex form of a function is

$$f(x) = (x + 1)^2 - 9$$

Which of the following gives a factored form of  $f(x)$  ?

- A)  $f(x) = (x - 2)(x + 4)$
  - B)  $f(x) = (x - 4)(x + 2)$
  - C)  $f(x) = (x - 3)(x + 3)$
  - D)  $f(x) = 9(x - 2)(x + 4)$
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**Problem #59**

The cost to rent a snowboard for  $x$  hours is represented by the function  $C(x)$ . If it costs \$48 to rent a snowboard for 6 hours, which of the following is true?

Select the correct equation.

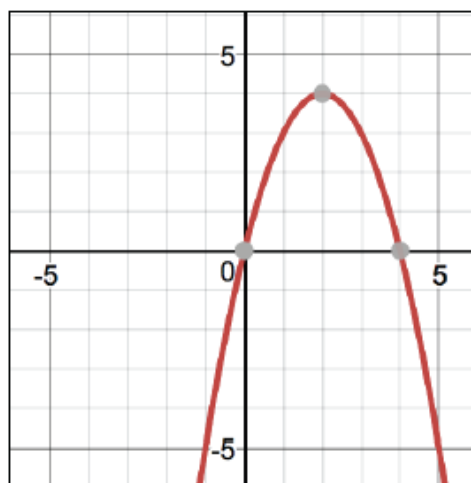
- A)  $C(6) = 8$
- B)  $C(8) = 6$
- C)  $C(48) = 6$
- D)  $C(6) = 48$

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**Problem #60**

Use the graph of the function,  $f(x) = 4x - x^2$ , to identify the intervals where  $f(x) < 0$ ?

- A)  $x < 0$
- B)  $0 < x < 2$
- C)  $2 < x < 4$
- D)  $x > 4$



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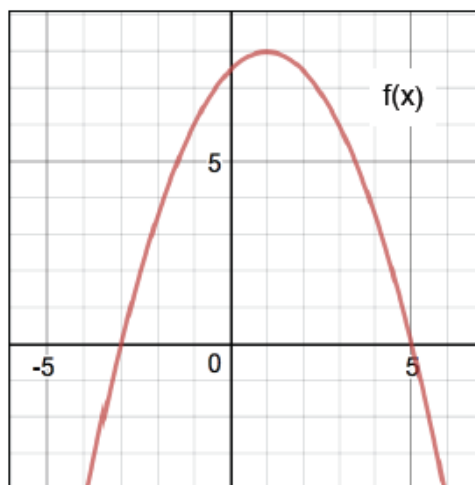
**Problem #61**

A function,  $f$ , with zeros at  $-3$  and  $5$  and a vertex at  $(1, 8)$  is graphed.

A function,  $g$ , is defined by  $g(x) = x + 3$

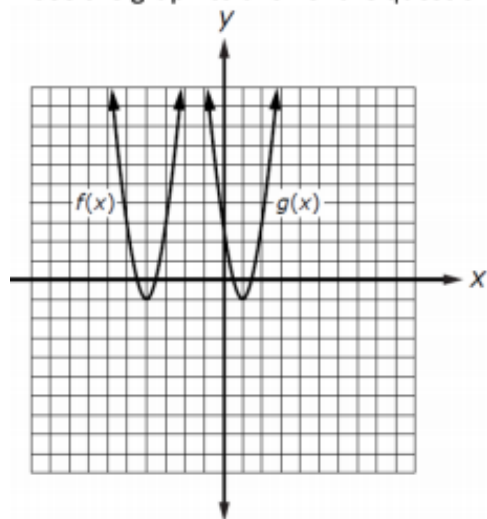
Which statement(s) are true for the functions  $f(x)$  and  $g(x)$ ?

- A)  $f(-3) \geq g(-3)$
- B)  $f(0) > g(0)$
- C)  $f(3) < g(3)$
- D)  $f(5) < g(5)$



**Problem #62**

Use the graph to answer the question.



Which equation relates  $f(x)$  with  $g(x)$ ?

- A.  $g(x) = f(x) + 5$
- B.  $g(x) = f(x) - 5$
- C.  $g(x) = f(x + 5)$
- D.  $g(x) = f(x - 5)$

**Problem #63**

The height,  $h$ , in feet, of an object thrown upward from a height of 144 feet is a function of time,  $t$ , in seconds. The height can be determined by the function  $h(t) = -16t^2 + 128t + 144$ . What is the height of the object at 3 seconds?

- A. 144 feet
- B. 384 feet
- C. 432 feet
- D. 672 feet

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**Problem #64**

Mold is observed to be spreading over a surface.

The area, in square inches, that is covered with mold can be modeled by the function

$$A(t) = 10(2)^t$$

where  $A(t)$  is the area covered by mold and  $t$  = time in weeks.

Which value and unit represent the average rate of change for weeks 1 through 6?

Select all that apply.

- A) 20
- B) 124
- C) 640
- D) square inches of mold per week
- E) weeks per square inch of mold