

TEST NAME: **IF.9 NEW**  
TEST ID: **971594**  
GRADE: **09 - Ninth Grade**  
SUBJECT: **Mathematics**  
TEST CATEGORY: **School Assessment**

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

Class: \_\_\_\_\_

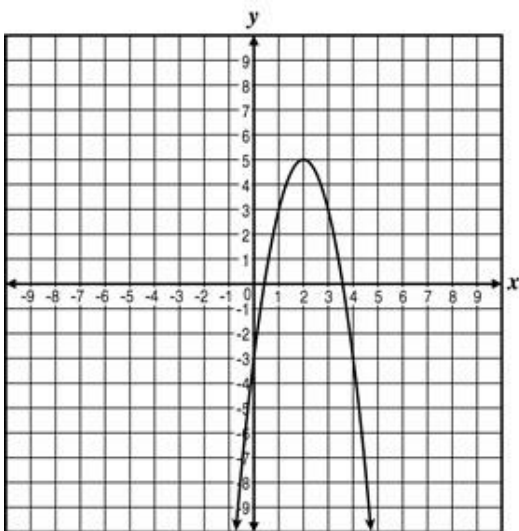
Date: \_\_\_\_\_

1. Allison compared the  $y$ -intercept of  $f(x) = 4 - 5x$  to the  $y$ -intercept of the function that fits the values in the table below.

$x$	$g(x)$
0	8
1	13
2	18
3	23

Which statement is true?

- A. The  $y$ -intercept of  $g(x)$  is half the  $y$ -intercept of  $f(x)$ .
  - B. The  $y$ -intercept of  $g(x)$  is two times the  $y$ -intercept of  $f(x)$ .
  - C. The  $y$ -intercept of  $g(x)$  is equal to the  $y$ -intercept of  $f(x)$ .
  - D. The  $y$ -intercept of  $g(x)$  is the negative value of the  $y$ -intercept of  $f(x)$ .
2. A function,  $f(x)$ , is defined by the equation  $f(x) = 2(x - 2)^2 + 5$ . Another function,  $h(x)$ , is graphed below.



Which statement describing both graphs of  $f(x)$  and  $h(x)$  is true?

- A. The parabolas open downward.
- B. The parabolas have the same vertices.
- C. The parabolas have the same  $y$ -intercept.
- D. The parabolas have the same maximum value.

3. Which statement is true about the function  $f(x) = 6x + 2$  and the linear function that fits the values in the table below?

$x$	$g(x)$
-1	8
1	-4
3	-16
5	-28
7	-40

- A.  $f(x)$  has the same slope as  $g(x)$ .
- B.  $f(x)$  has the same  $y$ -intercept as  $g(x)$ .
- C.  $f(x)$  has the same  $x$ -intercept as  $g(x)$ .
- D.  $f(x)$  and  $g(x)$  are the same function.
4. A function is given as  $f(x) = 2x - 6$ , and the function  $g(x)$  is seen in the table below.

$x$	$g(x)$
-1	6
0	3
1	0
2	-3
3	-6

Which statement is **true**?

- A. The function  $f(x)$  has a greater rate of change than the function  $g(x)$ .
- B. The function  $g(x)$  has a greater rate of change than the function  $f(x)$ .
- C. The function  $g(x)$  has a greater  $x$ -intercept than the function  $f(x)$ .
- D. The function  $f(x)$  has a greater  $y$ -intercept than the function  $g(x)$ .

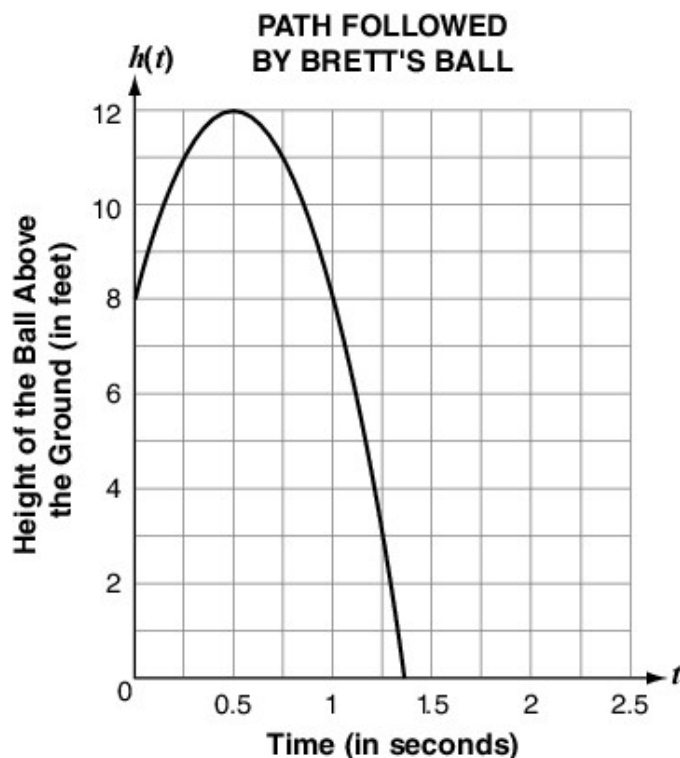
5. Maria compared the maximum value of the function  $f(x) = -x^2 + 4x - 1$  to the maximum value of the quadratic function that fits the values shown in the table below.

<b>x</b>	<b>g(x)</b>
-5	-41
-4	-20
-3	-5
-2	4

What is the value of the smaller maximum?

- A. -41
- B. -1
- C. 3
- D. 7

6. Joseph and Brett are standing on the roof of their houses. Both threw a ball into the air. The height of the ball,  $x$  seconds after Joseph threw it, is represented by the function  $f(x) = -16x^2 + 24x + 5$ . The height of the ball  $t$  seconds after Brett threw it is represented by the graph below.



Which of these statements comparing the paths of the balls is **correct**?

- A. The height from which Joseph threw the ball was 2 feet greater than the height from which Brett threw the ball.
- B. The ball that Joseph threw was in the air for approximately 0.25 second more than the time that the ball thrown by Brett was in the air.
- C. The ball that Joseph threw was in the air for approximately 0.32 second more than the time that the ball thrown by Brett was in the air.
- D. The ball that Joseph threw went 14 feet above the roof of his house as compared to the ball that Brett threw which went 12 feet above the roof of his house.

7. Which equation represents the relationship between  $x$  and  $y$  in the table?

$x$	$y$
1	2
2	5
3	10
4	17

- A.  $y = x + 1$
- B.  $y = 2x + 1$
- C.  $y = x^2 + 1$
- D.  $y = (x + 1)^2 - 2$

8. Patrick compared the function  $f(x) = x^2 - 6x + 9$  to the function  $g(x)$  equals the product of  $x$  plus 5 and the quantity  $x$  minus 2. Which statement is true about the two functions?

- A.  $f(x)$  has the smallest minimum value.
- B.  $g(x)$  has the largest  $y$ -intercept.
- C.  $f(x)$  has the largest root.
- D.  $g(x)$  has the largest  $x$ -intercept.

9. Jason compared the function  $f(x) = 20(1.2)^x$  to the function that fits the values in the table below.

$x$	1	2	3	4	5
$g(x)$	12	24	48	96	192

What is the distance between the  $y$ -intercepts of the two functions?

- A. 14
- B. 8
- C. 6
- D. 4

10. David rented a small truck for one day. The truck cost \$30.00 per day plus \$0.40 per mile driven. Which table represents these costs?

A. One Day Truck Rental

Miles Driven	Total Cost
5	\$30.40
10	\$30.80
15	\$31.20
20	\$31.60
25	\$32.00

B. One Day Truck Rental

Miles Driven	Total Cost
5	\$30.00
10	\$32.00
15	\$34.00
20	\$36.00
25	\$38.00

C. One Day Truck Rental

Miles Driven	Total Cost
5	\$30.00
10	\$30.40
15	\$30.80
20	\$31.20
25	\$31.60

D. One Day Truck Rental

Miles Driven	Total Cost
5	\$32.00
10	\$34.00
15	\$36.00
20	\$38.00
25	\$40.00

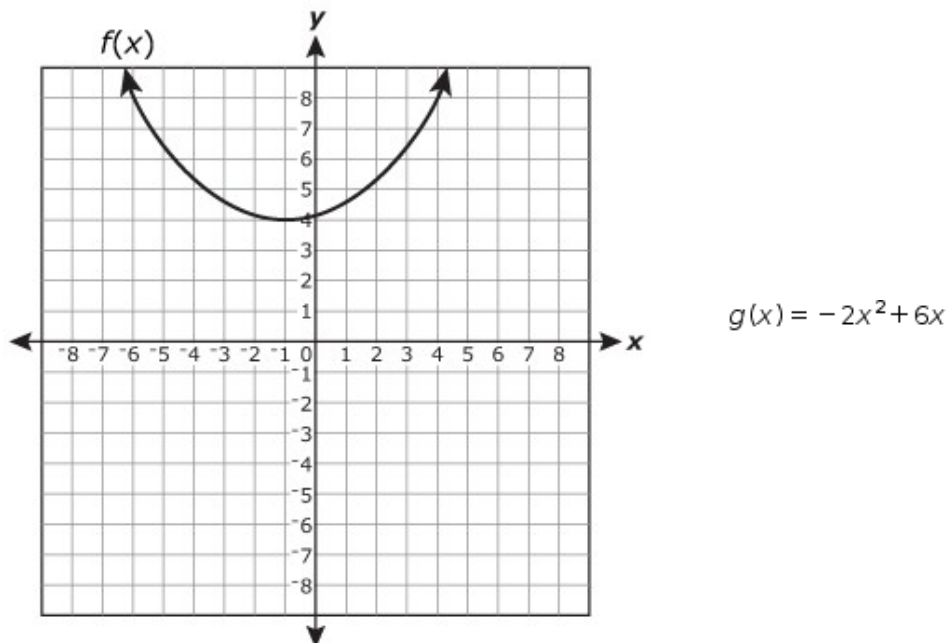
11. Angela earns \$8 for every hour she works at her job. The amount of money Kelly earns at her job is modeled by the function  $f(x) = 15t$ , where  $t$  represents hours worked. Angela and Kelly both worked 38 hours last week. Which statement accurately describes the amount of money Angela and Kelly earned last week?
- A. Angela made \$38 more than Kelly.
  - B. Kelly made \$266 more than Angela.
  - C. Angela made \$304 more than Kelly.
  - D. Kelly made \$570 more than Angela.

12. Maria compared the slope of the function  $f(x) = \frac{-1}{3}(-6x - 21)$  to the slope of the linear function that fits the values in the table below.

<b>x</b>	-4	-2	0	2	4
<b>g(x)</b>	9	8	7	6	5

Which **best** describes the slopes of the two functions?

- A. Both functions have a positive slope.
  - B. Both functions have a negative slope.
  - C. Function  $f(x)$  has a positive slope, while function  $g(x)$  has a negative slope.
  - D. Function  $f(x)$  has a negative slope, while function  $g(x)$  has a positive slope.
13. Both  $f(x)$  and  $g(x)$ , below, are quadratic functions modeled by parabolas.



Each function has a vertex. What is the height of the higher vertex?

- A.  $f(x)$  has the higher vertex at 4.
- B.  $g(x)$  has the higher vertex at  $\frac{9}{2}$ .
- C.  $f(x)$  has the higher vertex, because  $g(x)$  does not have a vertex.
- D.  $f(x)$  increases without bound, so the height of its vertex is infinite.

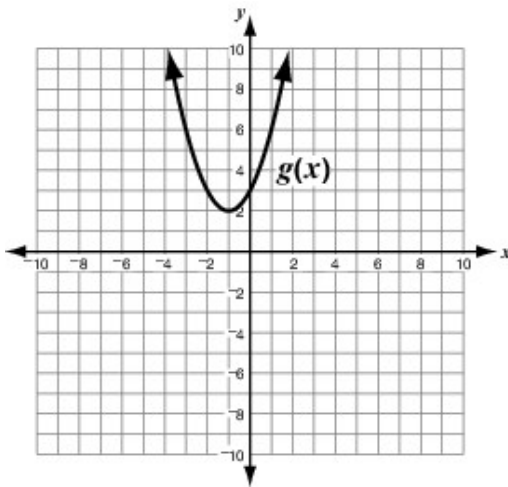


14. Janet compared the slope of  $f(x) = 2 - 3x$  to the slope of the linear function that fits the values in the table below.

$x$	$g(x)$
1	8
2	14
3	20
4	26
5	32

Which statement correctly describes the slope of the two functions?

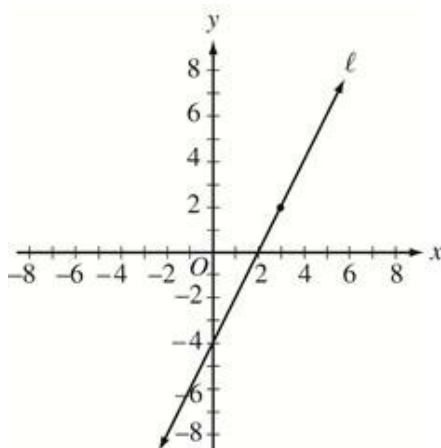
- A. The slope of  $f(x)$  and  $g(x)$  are the same.
  - B. The slope of  $f(x)$  is half the slope of  $g(x)$ .
  - C. The slope of  $f(x)$  is twice the slope of  $g(x)$ .
  - D. The slope of  $f(x)$  is half the opposite of the slope of  $g(x)$ .
15. A function  $f(x)$  is given as  $f(x) = (x - 1)^2 + 2$ . The graph of the function  $g(x)$  is shown below.



Which statement is **correct**?

- A. Both functions have  $x$ -intercepts.
- B. Both functions have the same  $y$ -intercept.
- C. Both functions have a vertex at  $(-1, 2)$ .
- D. Both functions have an axis of symmetry at  $x = 1$ .

16. The graph of line  $\ell$  is shown below. The slope of line  $k$  (not shown) is three times the slope of line  $\ell$ , and line  $k$  also contains the point  $(3, 2)$ .



Which of the following tables contains only points that are on line  $k$ ?

A.

$x$	-1	0	1
$y$	-10	-4	2

B.

$x$	-1	0	1
$y$	-14	-12	-10

C.

$x$	-1	0	1
$y$	-15	-9	-3

D.

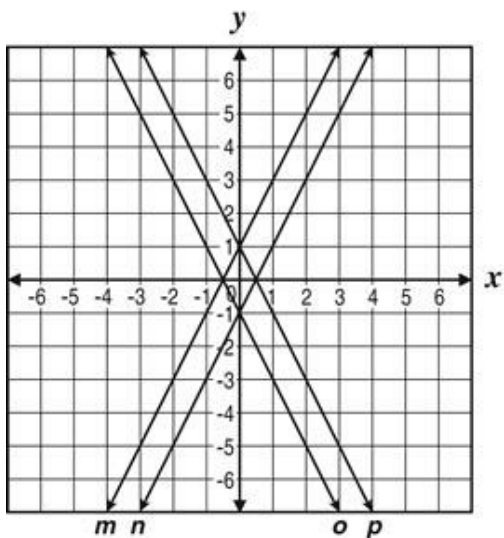
$x$	-1	0	1
$y$	-22	-16	-10

17. What is the rule for the function represented by the table below?

$x$	$y$
1	-1
3	5
6	14
7	17

- A. multiply the  $x$ -value by  $-3$  and add  $4$   
 B. multiply the  $x$ -value by  $3$  and subtract  $4$   
 C. subtract  $4$  from the  $x$ -value and divide by  $3$   
 D. subtract  $-4$  from the  $x$ -value and divide by  $-5$

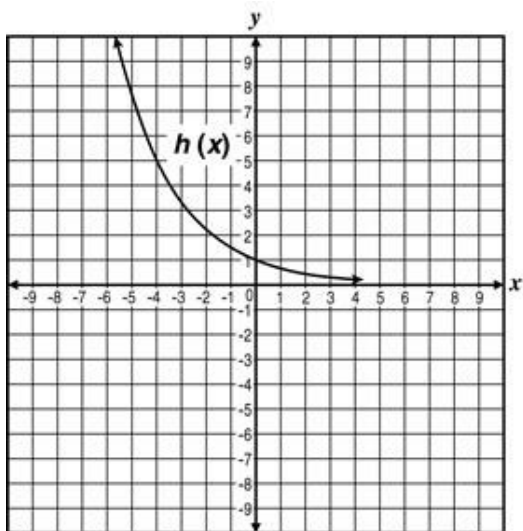
18. Lines  $m$ ,  $n$ ,  $o$ , and  $p$  are graphed on the coordinate grid below. A table of values for one of the lines, represented by the equation  $y = 2x + 1$ , is also provided.



$x$	$y$
0	1
1	3
-1	-1
2	5
-2	-3

Which line best represents the equation  $y = 2x + 1$ ?

- A.  $m$
  - B.  $n$
  - C.  $o$
  - D.  $p$
19. Exponential function  $g$  is defined as  $g(x) = \left(\frac{3}{2}\right)^x$ , and exponential function  $h$  is graphed below.

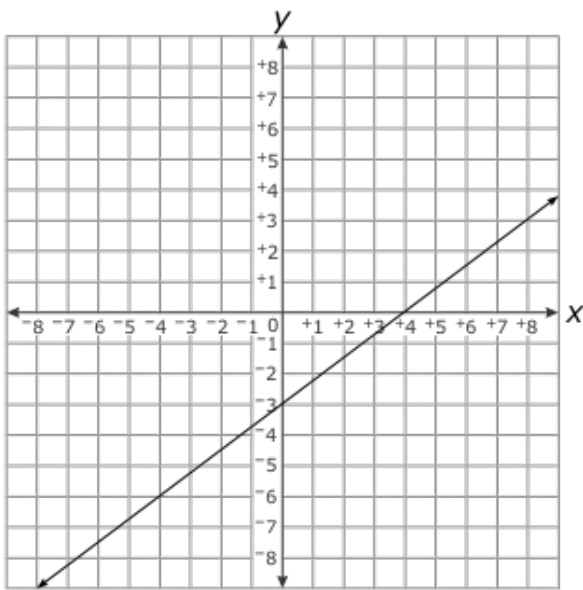


Which statement about the graphs of the two functions is not true?

- A.  $g(x) = h(-x)$
- B. Both functions are always decreasing.
- C. Both functions have the same  $y$ -intercept.
- D. The values of both functions are always positive.

20. How far is the  $y$ -intercept of the function that fits the values in the table below, from the  $y$ -intercept of the function graphed below?

$x$	$y$
3	1
5	5
7	9
9	13
11	17



- A. 1 unit
- B. 2 units
- C. 5 units
- D. 9 units

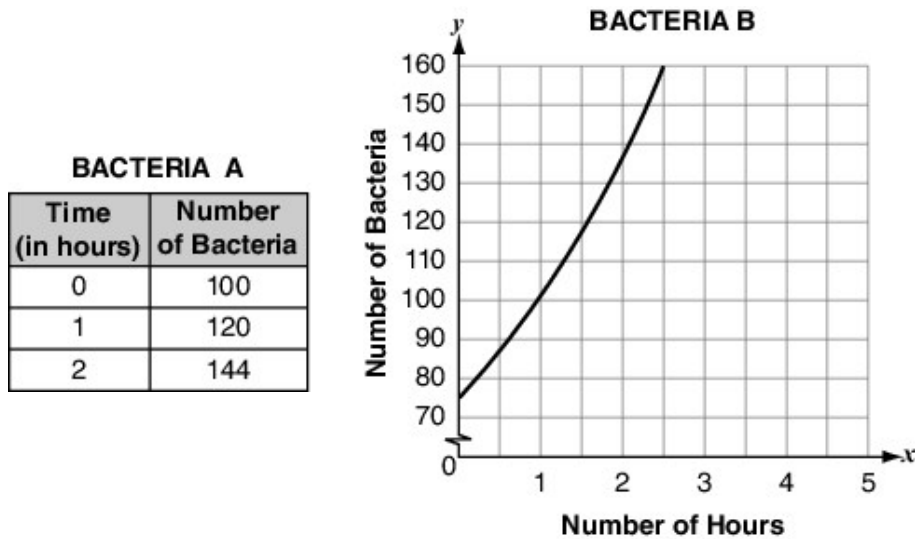
21. Joseph compared the function  $f(x) = 3x^2 + 2x - 1$  to the quadratic function that fits the values shown in the table below.

$x$	$g(x)$
0	-1
1	8
2	23
3	44
4	71

Which statement is true about the two functions?

- A. The functions have the same  $y$ -intercepts.
- B. The functions have the same  $x$ -intercepts.
- C. The functions have the same vertex.
- D. The functions have the same axis of symmetry.

22. The populations of two cultures of bacteria, *A* and *B*, after  $x$  hours are shown below.

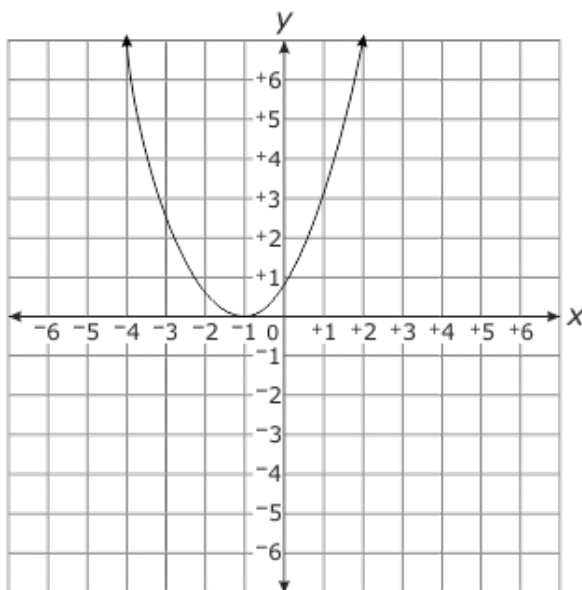


Which statement is a correct comparison of bacteria *A* and bacteria *B*?

- A. The initial population of bacteria *B* is more than the initial population of bacteria *A*.
- B. The populations of bacteria *A* and bacteria *B* will never be equal at the same time.
- C. The population of bacteria *B* is greater than the population of bacteria *A* after 3 hours.
- D. The rate of growth of bacteria *B* is less than the rate of growth of bacteria *A*.

23. Function  $p(x)$  is defined by the equation  $p(x) = x^2 - 6x + 5$ . Quadratic function  $q(x)$  intersects the  $x$ -axis at  $-4$  and  $2$  and passes through the point  $(-3, -15)$ . How does the value of the minimum for each function compare?
- A. Function  $p(x)$  has a minimum of  $5$ , and function  $q(x)$  has a minimum of  $-15$ .
  - B. Function  $p(x)$  has a minimum of  $-4$ , and function  $q(x)$  has a minimum of  $-27$ .
  - C. Function  $p(x)$  has a minimum of  $-4$ , and function  $q(x)$  has a minimum of  $-24$ .
  - D. Function  $p(x)$  has a minimum of  $14$ , and function  $q(x)$  has a minimum of  $-27$ .

24. Jenna compared the minimum of the function,  $f(x) = x^2 + 2x + 4$  to the minimum of the function graphed below.



What is the difference between the minimum values of the two functions?

- A. 2
  - B. 3
  - C. 4
  - D. 5
25. This table shows a relationship between  $x$  and  $y$ .

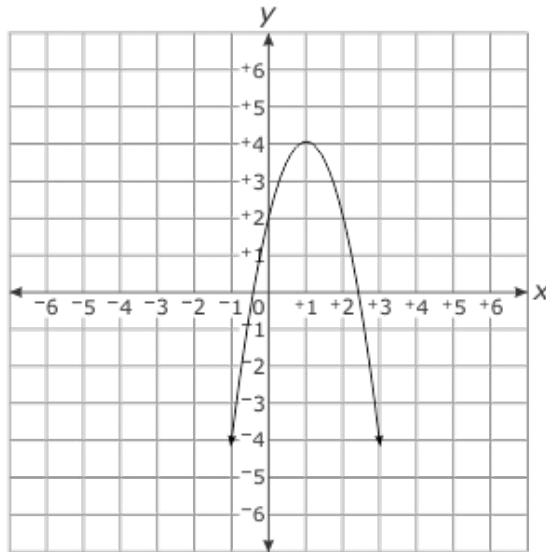
$x$	$y$
1	4
2	7
3	10
4	13

Which statement describes the relationship between these  $x$ - and  $y$ -values?

- A. The  $y$ -values are three greater than the  $x$ -values.
- B. The  $y$ -values are equal to three times the  $x$ -values.
- C. The  $y$ -values are three less than four times the  $x$ -values.
- D. The  $y$ -values are one greater than three times the  $x$ -values.



26. Aaron compared the maximum value of  $y = -2x^2 + 6x + 5$  to the maximum value of the function graphed below.



What is the x-value of the larger maximum?

- A. 1
- B. 1.5
- C. 4
- D. 9.5

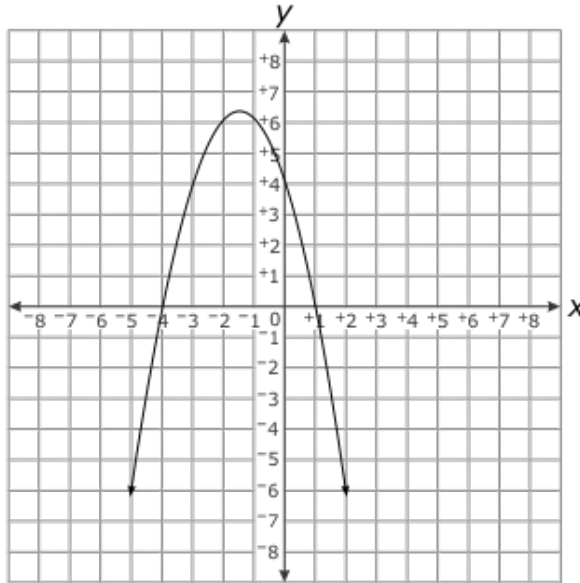
27. Two new cars were purchased from Frank's Auto Yard. Car A's value  $n$  years after its purchase is found using the function  $P(n) = 13,500(0.83)^n$ . Car B's value in different years is shown in the table below.

$n$	$Q(n)$
0	\$17,000
2	\$13,770
5	\$10,038
7	\$8,131

Using an exponential model, what is the **approximate** difference in the percent the two cars are depreciating?

- A. 17%
- B. 10%
- C. 7%
- D. 5%

28. Alisha compared the zeros of  $f(x) = 2x^2 - x - 10$  to the zeros of the function graphed below.



What is the value of the smallest zero of the two functions?

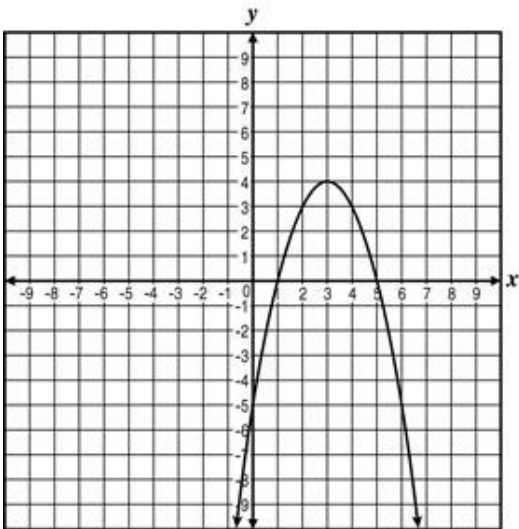
- A.  $-10$
  - B.  $-4$
  - C.  $-2$
  - D.  $1$
29. A function table is given below.

$x$	$y$
1	-3
2	-1
3	1
4	3

What is the rule for this function?

- A. subtract 5 from the  $x$  value and then multiply by 2
- B. multiply the  $x$  value by 2 and then subtract 5
- C. subtract 4 from the  $x$  value
- D. add 4 to the  $y$  value

30. The function  $g(x)$  is graphed below.



The graph of which function has the same vertex as  $g(x)$ ?

- A.  $q(x) = x^2 - 5$
- B.  $h(x) = (x - 3)^2 + 4$
- C.  $p(x) = (x + 3)^2 + 4$
- D.  $f(x) = (x - 5)^2 + 1$

31. A plumber charges a one-time fee for a service call plus a constant amount for each hour worked. The table shows the total amount charged by the plumber for different numbers of hours of work.

**Plumber's Charges**

Number of Hours Worked	Total Charge (dollars)
1	115
3	205
4	250
6	340

Based on the data in the table, which statement is true?

- A. The plumber charges \$45 for each hour worked.
- B. The plumber charges \$68 for each hour worked.
- C. The plumber charges \$90 for each hour worked.
- D. The plumber charges \$115 for each hour worked.

32. Sarah compared the function  $y = 7x + 13$  to the linear function that fits the values in the table below.

$x$	$y$
-3	1
2	-9
5	-15
7	-19

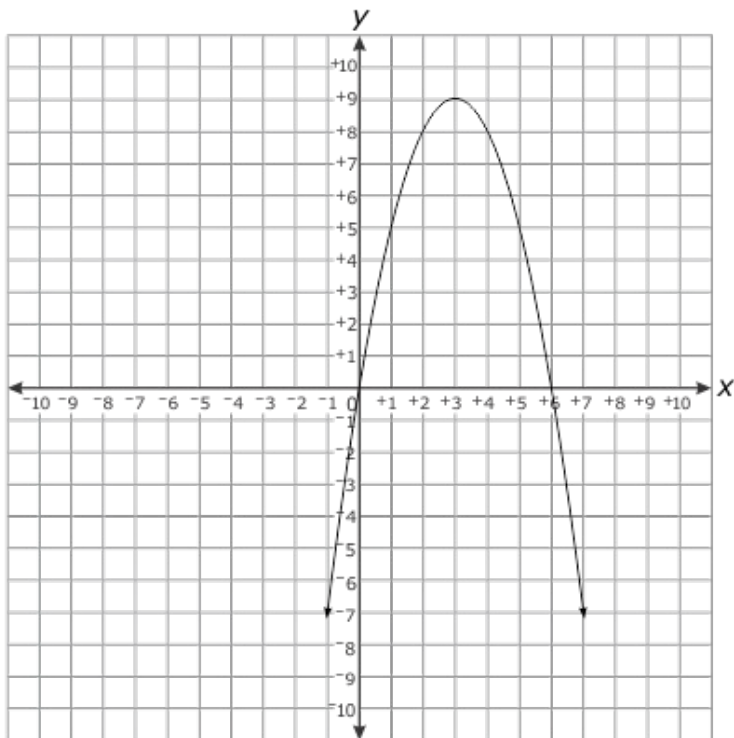
What is the distance between the  $y$ -intercepts of the two functions?

- A. 5
  - B. 9
  - C. 13
  - D. 18
33. Which statement best describes the data in the table?

$x$	$y$
-1	-7
0	-5
3	1
5	5

- A. The value of  $y$  is 6 less than the value of  $x$ .
- B. The value of  $y$  is 2 less than the value of  $x$ .
- C. The value of  $y$  is 5 less than twice the value of  $x$ .
- D. The value of  $y$  is 8 less than three times the value of  $x$ .

34. Shelly compared the maximum value of the function  $f(x) = -2x^2 + 8x + 2$  to the maximum value of  $g(x)$  graphed below.



What is the value of the larger maximum?

- A. 2
- B. 3
- C. 9
- D. 10

35. A machine can make 54 paper bags in 2 minutes. If the machine makes the bags at a constant rate, which table below shows the number of bags it can make over a 5-minute period?

A.

Number of Minutes	Number of Bags
1	27
2	54
3	81
4	108
5	135

B.

Number of Minutes	Number of Bags
1	54
2	81
3	108
4	135
5	162

C.

Number of Minutes	Number of Bags
1	27
2	54
3	108
4	135
5	162

D.

Number of Minutes	Number of Bags
1	54
2	108
3	216
4	432
5	864

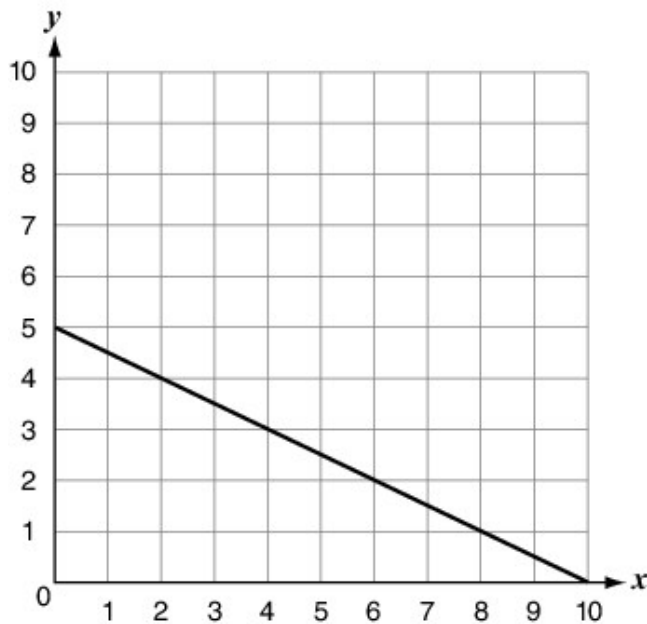
36. One function,  $f(x)$ , is defined as  $f(x) = (x + 4)^2 - 3$ . A second function,  $g(x)$ , is a parabola that passes through the points shown in the table.

$x$	0	1	2	3	4	5
$g(x)$	4	3	4	7	12	19

What is the absolute value of the difference of the  $y$ -intercepts of  $f(x)$  and  $g(x)$ ?

- A. 6
- B. 9
- C. 13
- D. 15

37. The graph of a linear function  $f(x)$  is shown below.



Which of these statements **correctly** compares the graphed function  $f(x)$  to the function  $g(x) = \frac{x}{2} + 5$ ?

- A. The rate of change of  $f(x)$  and  $g(x)$  is  $\frac{1}{2}$ .
- B. The rate of change of  $f(x)$  and  $g(x)$  is 5.
- C. The rate of change of  $f(x)$  is  $-\frac{1}{2}$  and of  $g(x)$  is  $\frac{1}{2}$ .
- D. The rate of change of  $f(x)$  is  $-\frac{1}{2}$  and of  $g(x)$  is 2.

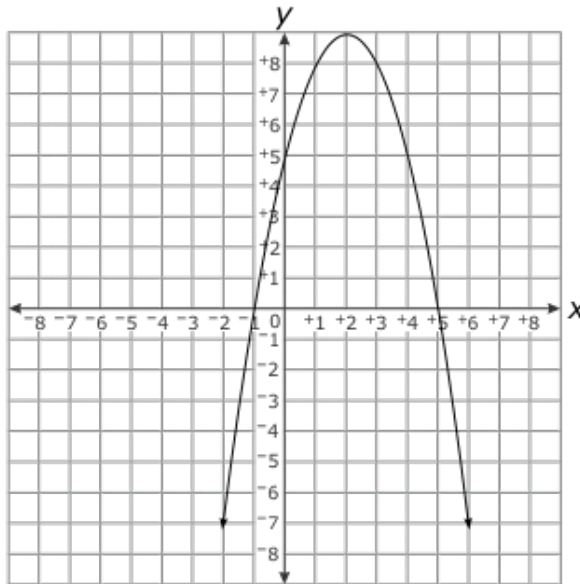


38. Margaret compared the function  $f(x) = \frac{x}{2} + 1$  to the function that fits the values in the table below.

$x$	$g(x)$
2	5
3	7
4	9
5	11

Which statement below is true?

- A. The slope of  $f(x)$  is half the slope of  $g(x)$ .
  - B. The slope of  $f(x)$  is twice the slope of  $g(x)$ .
  - C. The slope of  $f(x)$  is one fourth the slope of  $g(x)$ .
  - D. The slope of  $f(x)$  is four times the slope of  $g(x)$ .
39. Megan compared the maximum value of  $f(x) = -4x^2 + 2x + 1$  to the maximum value of the function graphed below.



What is the value of the smaller maximum?

- A. 0.25
- B. 1.25
- C. 2
- D. 9

40. Carlos and Juan are throwing water balloons from a height of 12 feet. Carlos models the height of his balloon in feet,  $h$ , over the time in seconds after throwing it,  $t$ , with the equation  $h = -16t^2 + 8t + 12$ . Juan uses a motion sensor to record the height of his balloon in feet,  $h$ , over the time in seconds after throwing it,  $t$ , in the table below.

**DATA FOR JUAN'S BALLOON**

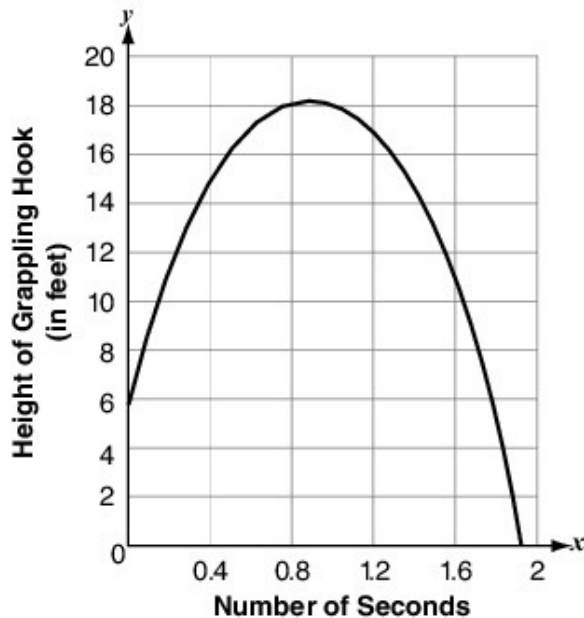
**Time (seconds) Height (feet)**

0.9	11.64
1	10
1.1	8.04
1.2	5.76

If Carlos and Juan both toss the balloons at the same time, approximately how much time will elapse before the first balloon reaches the ground?

- A. between 1.1 and 1.2 seconds
- B. between 1.2 and 1.3 seconds
- C. between 1.3 and 1.4 seconds
- D. between 1.4 and 1.5 seconds

41. Austin and Janda threw grappling hooks into the air. The function  $f(x) = -16x^2 + 32x + 5$  gives the height, in feet, of Austin's hook  $x$  seconds after he threw it. The graph below shows the height, in feet, of Janda's hook  $x$  seconds after she threw it.



If both of them threw the grappling hooks at the same time, which of these statements is **true**?

- A. Austin's hook hit the ground first.
- B. Austin's hook reached its maximum height first.
- C. Austin's hook reached a greater maximum height.
- D. Austin threw the hook from a greater initial height.

42. Quadratic functions  $f$  and  $g$  are represented in two different ways as shown below.

$$f(x) = -(x - 5)^2 + 3$$

$x$	$g(x)$
-3	4
-2	-2
-1	-4
0	-2
1	4
2	14
3	28

Which statement about the graphs of the two functions is true?

- A. They intersect at a total of two points.
- B. The  $y$ -intercept of  $f$  is greater than the  $y$ -intercept of  $g$ .
- C. They show that  $f$  is decreasing, and  $g$  is increasing between  $x = 1$  and  $x = 2$ .
- D. They show that  $f$  has a maximum value of 3, and  $g$  has a minimum value of  $-4$ .