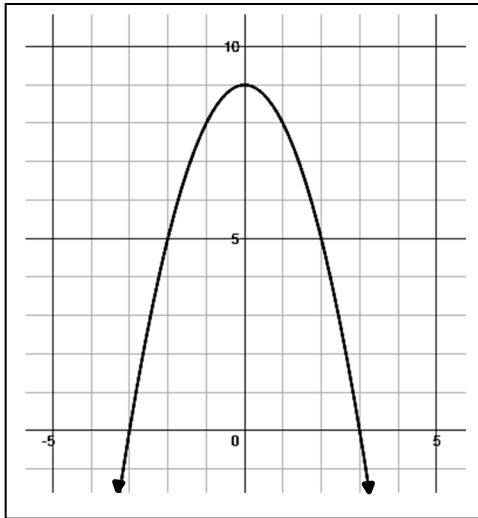


1. The graph of  $f(x)$  is shown below. State whether each statement is True or False.



- a.  $f(x)$  is decreasing when  $x > 0$  a. \_\_\_\_\_
- b. The axis of symmetry is  $y = 0$  b. \_\_\_\_\_
- c. The maximum value of  $f(x)$  is 9 c. \_\_\_\_\_
- d.  $(2, 5)$  is a solution of  $f(x)$  d. \_\_\_\_\_
- e.  $(-1, 3)$  is a solution of  $f(x)$  e. \_\_\_\_\_
- f.  $(3, 0)$  is an x intercept of  $f(x)$  f. \_\_\_\_\_
- g.  $(0, 9)$  is an x intercept of  $f(x)$  g. \_\_\_\_\_
- h. The axis of symmetry is  $x = 0$  h. \_\_\_\_\_
- i. The vertex is  $(0, 9)$  i. \_\_\_\_\_
- j. The value of  $x$  when  $f(x)$  reaches its maximum is 0 j. \_\_\_\_\_

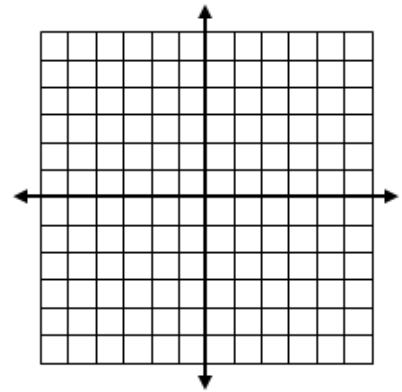
2. Using  $f(x)$  in #1 above, determine:

- a. The domain of  $f(x)$ : \_\_\_\_\_
- b. The range of  $f(x)$ : \_\_\_\_\_
- c. Determine the rule for translating  $g(x) = -x^2$  to  $f(x)$ :  $(x, y) \rightarrow (\_\_\_, \_\_\_)$

3. Selected values of the quadratic function,  $k(x)$ , are shown in the table. Sketch  $k(x)$ , and determine:

$x$	-6	-5	-4	-3	-2	-1	0	1	2
$k(x)$	-7	0	5	8	9	8	5	0	-7

- a. The  $x$ -intercept(s) of  $k(x)$  \_\_\_\_\_
- b. The  $y$ -intercept(s) of  $k(x)$  \_\_\_\_\_
- c. The value of  $x$  when  $k(x)$  is at its maximum \_\_\_\_\_
- d. The maximum value of  $k(x)$  \_\_\_\_\_
- e.  $k(x)$  is increasing when  $x$  \_\_\_\_\_
- f.  $k(x)$  is decreasing when  $x$  \_\_\_\_\_



4. Match the equation to the number that reveals the characteristics of the equation without changing the form of the equation.

- a.  $m(x) = -3(x + 1)(x - 5)$  1. Reveals the maximum value of  $m(x)$  a. \_\_\_\_\_
- b.  $m(x) = -3x^2 + 12x + 15$  2. Reveals the zeros ( $x$ -intercepts) of  $m(x)$  b. \_\_\_\_\_
- c.  $m(x) = -3(x - 2)^2 + 27$  3. Reveals the value of  $m(x)$  when  $x = 0$  c. \_\_\_\_\_

5. In order to factor the left side of the equation, choose from the number box to fill in the blanks in the expression below.

-10	-5	-3	-2	-1	+1	+2	+3	+5	+10
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- a.  $2x^2 + 7x - 15 = 0$   
 $(\_\_\_x + \_\_\_)(\_\_\_x + \_\_\_) = 0$
- b.  $5x^2 - 51x + 10 = 0$   
 $(\_\_\_x + \_\_\_)(\_\_\_x + \_\_\_) = 0$

6. For each of the following, state the vertex, and determine whether it has a maximum or minimum.

a.  $f(x) = -(x - 5)^2 + 2$

b.  $f(x) = (x - 5)^2 + 2$

c.  $f(x) = (x + 5)^2 + 2$

Vertex: \_\_\_\_\_

Vertex: \_\_\_\_\_

Vertex: \_\_\_\_\_

Max or Min

Max or Min

Max or Min

7. For each of the following, state the axis of symmetry.

a.  $f(x) = -(x + 1)^2 - 3$

b.  $f(x) = (x + 5)^2 + 7$

c.  $f(x) = (x + 4)^2 - 9$

AOS: \_\_\_\_\_

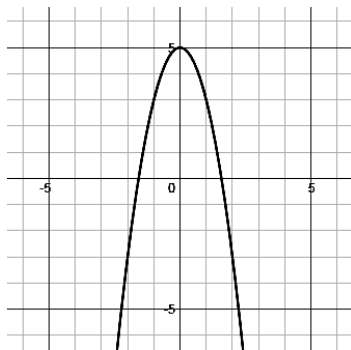
AOS: \_\_\_\_\_

AOS: \_\_\_\_\_

8. Determine if each ordered pair is a solution to the function  $y = -3x^2 + 1$ .

	Work	Yes	No
(0, 1)			
(2, 37)			
(2, 11)			
(1, 8)			

9. Given the graph below, answer the following questions:



a. Vertex: \_\_\_\_\_

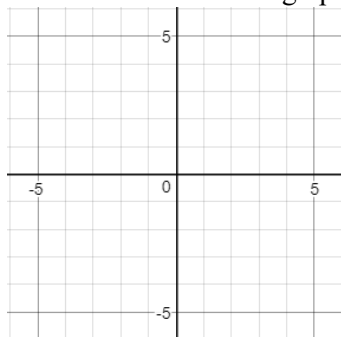
b. Max/Min Value: \_\_\_\_\_

c. Axis of symmetry: \_\_\_\_\_

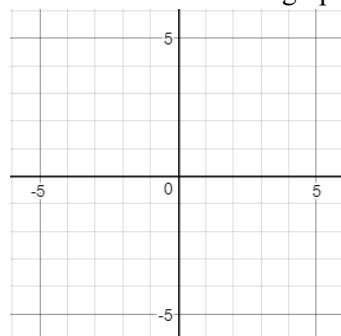
d. Graph is increasing: \_\_\_\_\_

e. Graph is decreasing: \_\_\_\_\_

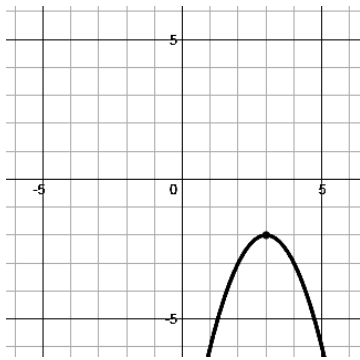
10. What is the transformation of the graph of  $f(x)$  to  $g(x)$  when  $f(x) = x^2$  and  $g(x) = (x + 4)^2 - 2$



11. What is the transformation of the graph of  $f(x)$  to  $g(x)$  when  $f(x) = x^2$  and  $g(x) = (x - 3)^2 + 1$



12. The graph of  $f(x)$  is shown below, the table represent some values for  $g(x)$ .



$x$	-1	0	1	2	3	4	5	6	7
$g(x)$	-6	-2.5	0	1.5	2	1.5	0	-2.5	-6

- Which graph has the greater maximum value? \_\_\_\_\_
- The value of  $x$  when  $g(x)$  is at its maximum, is greater than the value of  $x$  when  $f(x)$  is at its maximum. Yes or No
- State the  $x$  intercept(s) of  $g(x)$ : \_\_\_\_\_

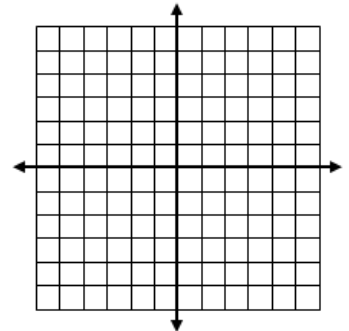
13. State the zeros for  $h(x) = x^2 - 5x - 14$

14. A ball is thrown into the air and is represented by the equation  $h(t) = -3(t - 3)^2 + 23$ , where  $h(t)$  is the height of the ball and  $t$  is the time in seconds. Find the time it takes for the ball to reach the maximum height.

- Time it takes to reach Maximum height: \_\_\_\_\_
- What is the domain: \_\_\_\_\_
- What is the range: \_\_\_\_\_

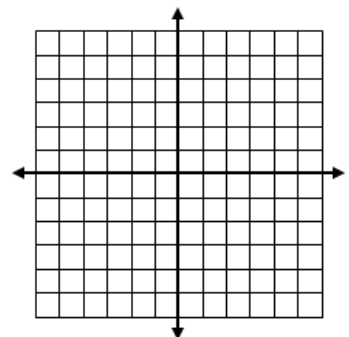
15. Graph:  $y = -2(x + 1)^2 - 2$

- Vertex: \_\_\_\_\_
- Domain: \_\_\_\_\_
- Range: \_\_\_\_\_
- Axis of symmetry: \_\_\_\_\_



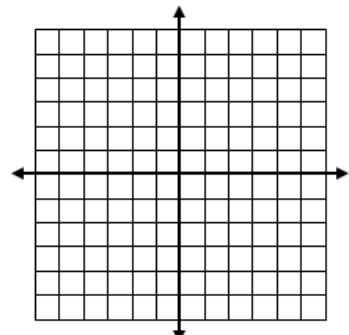
16. Graph  $y = -x^2 - 4x - 3$

- $x$ -intercepts: \_\_\_\_\_ and \_\_\_\_\_
- Vertex: \_\_\_\_\_
- Axis of symmetry: \_\_\_\_\_



17. Graph  $y = x^2 - 4x - 5$

- $x$ -intercepts: \_\_\_\_\_ and \_\_\_\_\_
- Vertex: \_\_\_\_\_
- Axis of symmetry: \_\_\_\_\_



18. Given  $f(x) = x^2$  and  $g(x) = 3^x$  evaluate:

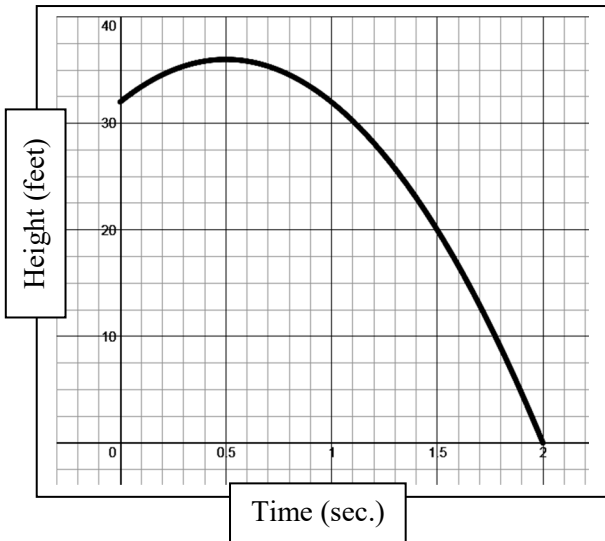
a. Average rate of change of  $f(x)$  from  $x = 0$  to  $x = 3$  18a. \_\_\_\_\_

b. Average rate of change of  $g(x)$  from  $x = 0$  to  $x = 3$  18b. \_\_\_\_\_

c. What do these average rates of change tell you about functions  $f(x)$  and  $g(x)$ ?  
 \_\_\_\_\_  
 \_\_\_\_\_

d. How are the average rate of changes different? Why?  
 \_\_\_\_\_  
 \_\_\_\_\_

19. The graph of  $h(t) = -16(t - \frac{1}{2})^2 + 36$  models the path of a rocket's height,  $h$ , with respect to time,  $t$ .



Choose True or False:

Statement	True	False
19a. The maximum height of the rocket is at 36 feet.		
19b. The maximum height is 2 feet.		
19c. It took 2 seconds for the rocket to hit the ground.		
19d. The rocket started at an initial height of 30 feet.		
19e. The rocket was increasing in height between time 0 and time 0.5 sec.		

[20-23] Find the zeros by the method of your choice. If there is no solution, write *none*.

20.  $2x^2 - 32 = 0$

21.  $(x - 1)^2 - 49 = 0$

22.  $-2(x + 3)^2 + 50 = 0$

23.  $x^2 - 6x - 40 = 0$

24. Which model is most appropriate for each set? Choose from linear, quadratic, or exponential.

a.

$x$	$y$
0	1
1	3
2	9
3	27

b.

$x$	$y$
0	0
1	3
2	6
3	9

c.

$x$	$y$
0	0
1	3
2	12
3	27

Model: \_\_\_\_\_

Model: \_\_\_\_\_

Model: \_\_\_\_\_