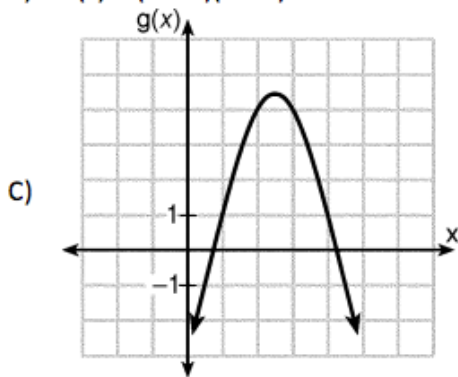


Name: _____

- 1) The function $f(x) = 5x^2 + 20x + 14$ will have
- A) a minimum at $(-2, -6)$
 - B) a minimum at $(10, -86)$
 - C) a maximum at $(-2, -6)$
 - D) a minimum at $(-2, 10)$

- 2) What is an equation of the axis of symmetry of the graph of the function $f(x) = 2x^2 - 5x + 3$?
- A) $x = -\frac{5}{2}$
 - B) $x = -\frac{5}{4}$
 - C) $x = \frac{5}{2}$
 - D) $x = \frac{5}{4}$

- 3) Which quadratic function has the *largest* maximum?
- A) $k(x) = -5x^2 - 12x + 4$
 - B) $h(x) = (3 - x)(2 + x)$



D)

x	f(x)
-1	-3
0	5
1	9
2	9
3	5
4	-3

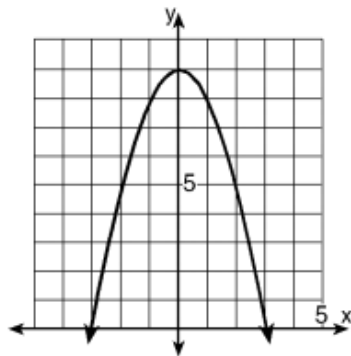
- 4) Which point is *not* on the graph represented by $y = x^2 + 3x - 6$?
- A) $(-4, -2)$
 - B) $(3, -6)$
 - C) $(2, 4)$
 - D) $(-6, 12)$

- 5) What are the zeros of the function $f(x) = x^2 - 2x - 15$?
- A) $x = 5$ and $x = 3$
 - B) $x = 5$ and $x = -3$
 - C) $x = -5$ and $x = 3$
 - D) $x = -5$ and $x = -3$

- 6) How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?
- A) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
 - B) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
 - C) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
 - D) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

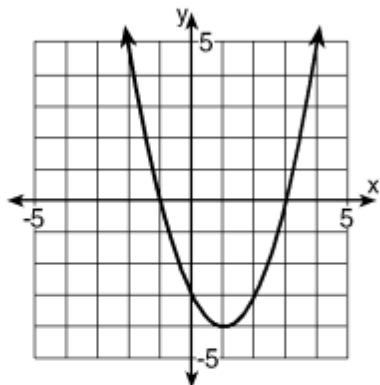
- 7) The coordinates of the vertex of the parabola whose equation is $g(x) = x^2 - 6x + 8$ are
- A) $(-3, 35)$
 - B) $(-3, -1)$
 - C) $(3, -1)$
 - D) $(3, 35)$

- 8) Which of the following is an accurate conclusion that can be drawn from the parabola below?



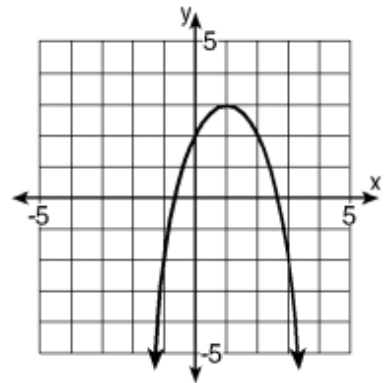
- A) the maximum value is at (0,9)
- B) the vertex is at (3,0)
- C) the minimum value is at (-3,0)
- D) the axis of symmetry is $y = 9$

- 9) What are the zeros of the polynomial function graphed below?



- A) $x = 0$ and $x = -3$
- B) $x = -1$ and $x = 0$
- C) $x = -1$ and $x = 3$
- D) $x = -3$ and $x = 3$

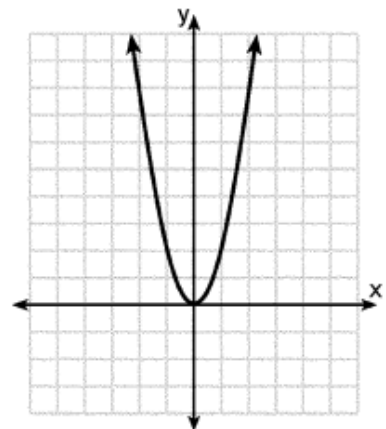
10)



Which of the following statements *best* describes given the graph?

- A) The y -intercept is 3.
- B) The axis of symmetry is $y = 1$.
- C) The maximum occurs when $x = 3$.
- D) The axis of symmetry is $x = 1$.

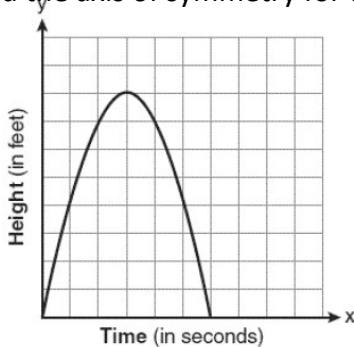
- 11) The graph of the equation $y = ax^2$ is shown below.



If a is multiplied by $-\frac{1}{2}$, the graph of the new equation is

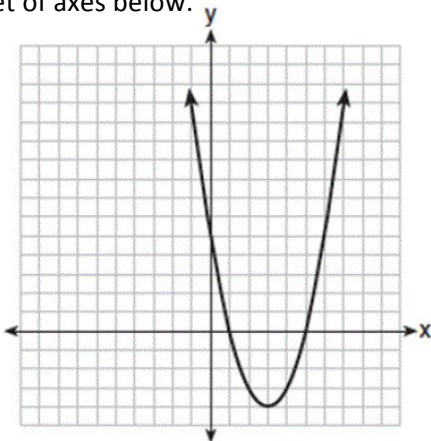
- A) wider and opens downward
- B) narrower and opens downward
- C) wider and opens upward
- D) narrower and opens upward

12. The graph below represents the parabolic path of a ball kicked by a young child. What are the vertex and the axis of symmetry for the parabola?



- a. Vertex: (3, 8), axis of symmetry: $x = 3$
- b. Vertex: (8, 3), axis of symmetry: $x = 3$
- c. Vertex: (3, 8), axis of symmetry: $y = 3$
- d. Vertex: (8, 3), axis of symmetry: $y = 3$

13. The equation $y = ax^2 + bx + c$ is graphed on the set of axes below.



Based on the graph, what are the roots of the equation $ax^2 + bx + c = 0$?

- a. 0 and 5
- b. 1 and 0
- c. 1 and 5
- d. 3 and -4

14. The graph of a parabola is represented by the equation $y = ax^2$ where a is a positive integer. If a is multiplied by 2, the new parabola will become

- a. narrower and open downward
- b. wider and open downward
- c. narrower and open upward
- d. wider and open upward

For 15 and 16, convert to vertex form using completing the square.

15.

$$f(x) = x^2 - 6x + 14$$

Show your work.

Equation: _____

Vertex: _____

Axis of symmetry: _____

Range: _____

16.

$$f(x) = -x^2 + 14x - 46$$

Show your work.

Equation: _____

Vertex: _____

Axis of symmetry: _____

Range: _____

17. Find the equation of the axis of symmetry and the coordinates of the vertex for $f(x) = -2(x + 3)^2 + 8$.

Axis of symmetry: _____

Vertex: _____

18. Find the equation of the axis of symmetry and the coordinates of the vertex for $f(x) = -2x^2 - 4x + 6$.

Show your work.

Axis of symmetry: _____

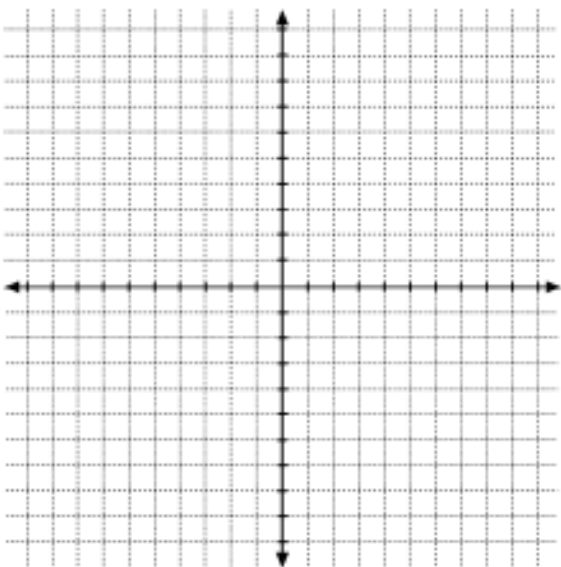
Vertex: _____

19. What is the equation the graph of $y = x^2$ after it has been translated 3 units to the left and 7 units up?

20. Describe the transformation that would produce the graph of the function g from the graph of function f .

$$f(x) = x^2, g(x) = \frac{1}{2}(x - 2)^2 - 3$$

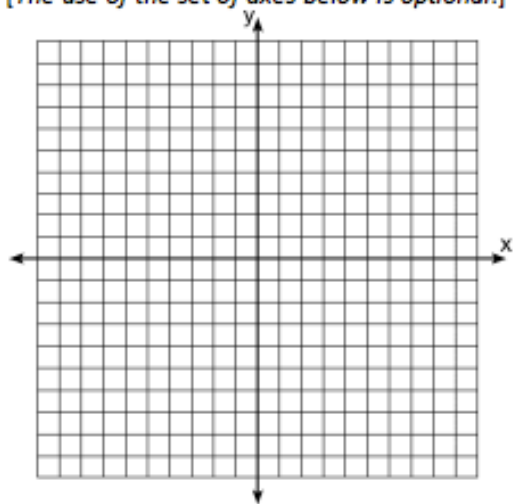
21. (a) Graph the equation $y = x^2 + 2x - 8$ from $x = -5$ to $x = 3$.
 (b) Using the graph drawn in part (a), determine the roots of the equation.



22. The vertex of the parabola represented by $f(x) = x^2 - 4x + 3$ has coordinates $(2, -1)$. Find the coordinates of the vertex of the parabola defined by $g(x) = f(x - 2)$.

Show your work.

[The use of the set of axes below is optional.]



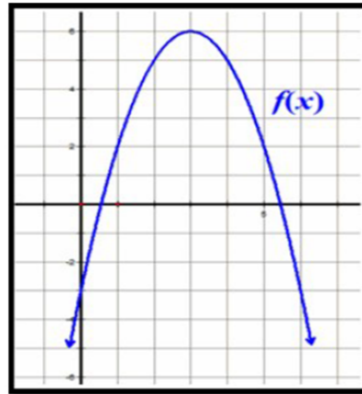
Explain how you arrived at your answer.

23. The function $p(x)$ includes the point $(0, 5)$. What are the coordinates of the point after the shift of $p(x) - 2$?

24. The function $m(x)$ includes the point $(-3, -4)$. What are the coordinates of the point after the shift of $m(x + 4)$?

25. Alicia and Brent were comparing the vertex of two quadratic functions. Brent stated that $f(x)$ and $g(x)$ have different maximum values. Alicia thinks that both functions have a maximum of 6. Is either of them correct? Justify your answer.

$$g(x) = -x^2 + 3x + 4$$



26. The path of a rocket fired during a fireworks display is given by the equation $h(t) = 64t - 16t^2$, where t is the time, in seconds, and $h(t)$ is its height, in feet.

(a) What is the maximum height, in feet, the rocket will reach? *[only an algebraic solution will be accepted]*

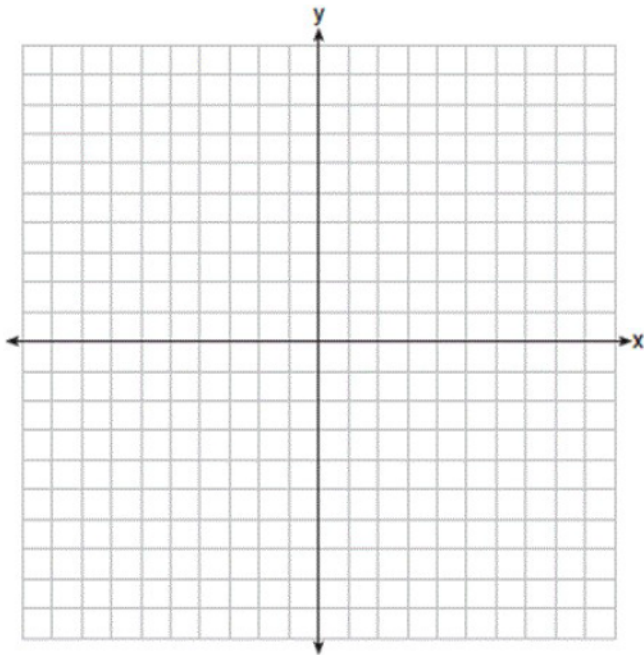
(b) How many seconds will it take the rocket to hit the ground? *[only an algebraic solution will be accepted]*

27. Solve the following system of equations algebraically:

$$y = x^2 - 6x + 9$$

$$y = -x - 7$$

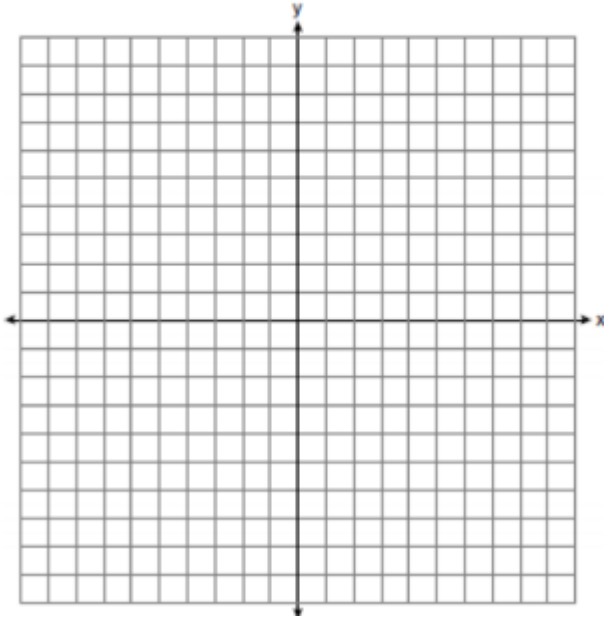
28. Let $f(x) = x^2 + 4x - 5$ and $g(x) = 2x + 3$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$. Using this graph, determine and state all coordinates for which $f(x) = g(x)$.



31. Solve the following systems of equations graphically, on the set of axes below, and state the coordinates of the point(s) in the solution set.

$$y = x^2 - 6x + 5$$

$$2x + y = 5$$



32. Solve and check the following system

$$y - 2x = 3$$

$$y = -x^2 - x + 1$$