

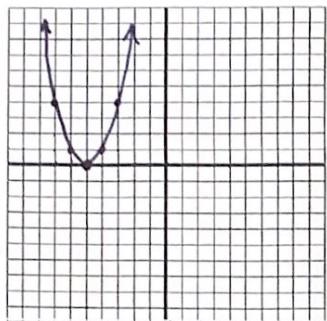
Section 2.4 WS 2

Name KEY

Graph the quadratic function, then state the axis of symmetry.

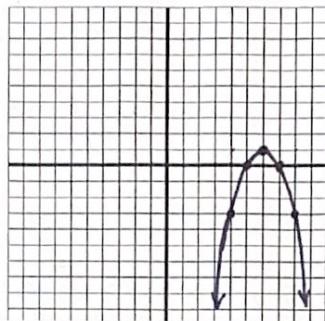
1. $f(x) = (x+5)^2$ $V: (-5, 0)$

Axis of Symmetry: $x = -5$



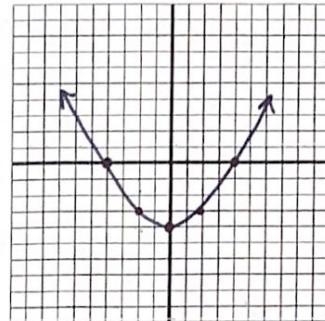
2. $f(x) = -(x-6)^2 + 1$ $(6, 1)$

Axis of Symmetry: $x = 6$



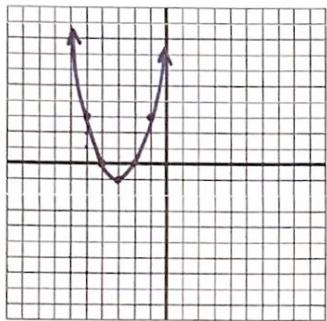
3. $f(x) = \frac{1}{4}x^2 - 4$ $(0, -4)$

Axis of Symmetry: $x = 0$



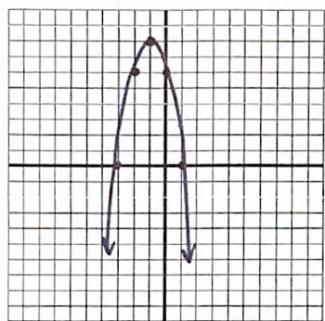
4. $g(x) = x^2 + 6x + 8$ $V: (-3, -1)$

Axis of Symmetry: $x = -3$



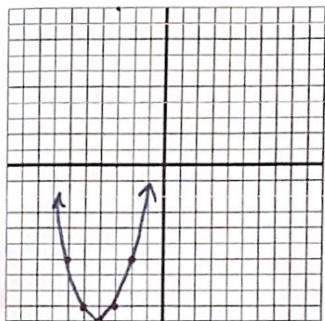
5. $f(x) = -2x^2 - 4x + 6$ $V: (-1, 8)$

Axis of Symmetry: $x = -1$



6. $h(x) = x^2 + 6x - 1$ $V: (-3, -10)$

Axis of Symmetry: $x = -3$



Write the quadratic function in vertex form.

7. $h(t) = t^2 - 6t$

$a = 1$

$V: (3, -9)$

$$h(t) = (t-3)^2 - 9$$

8. $f(x) = x^2 - 4$

$$f(x) = x^2 - 4$$

9. $g(t) = -t^2 + 6t + 1$

$a = -1$

$V: (3, 10)$

$$g(t) = -(t-3)^2 + 10$$

10. $h(x) = 3x^2 - 10x + 2$

$a = 3$

$x = \frac{10}{6} = \frac{5}{3}$

$$\begin{aligned} h(x) &= 3\left(\frac{5}{3}\right)^2 - 10\left(\frac{5}{3}\right) + 2 \\ h(x) &= -\frac{19}{3} \end{aligned}$$

$$h(x) = 3\left(x - \frac{5}{3}\right)^2 - \frac{19}{3}$$

Find the range of the quadratic function.

11. $f(x) = -x^2 + 6x + 7$

$$\{y | y \leq 16\}$$

12. $h(x) = 2x^2 - 9x + 10$

$$\{y | y \geq -\frac{1}{8}\}$$

Find the zeros of f and the x -intercepts of the graph of f .

$$13. f(x) = x^2 - 10x + 16$$
$$\begin{array}{r} \\ \diagup \\ -2 \end{array}$$
$$\begin{array}{r} \\ \diagdown \\ -8 \end{array}$$

Zeros: $2 \notin 8$

x -intercept: $(2, 0) \notin (8, 0)$

$$14. h(x) = 3x^2 - 7x - 6$$
$$\begin{array}{r} \\ \diagup \\ -9 \end{array}$$
$$\begin{array}{r} \\ \diagdown \\ 3 \end{array}$$
$$\begin{array}{r} \\ \diagup \\ 2 \end{array}$$
$$\begin{array}{r} \\ \diagdown \\ 3 \end{array}$$

Zeros: $3 \notin \frac{-2}{3}$

x -intercepts: $(3, 0) \notin \left(\frac{-2}{3}, 0\right)$

Find the minimum or maximum value of the function. State whether this value is a minimum or a maximum.

$$15. g(t) = -t^2 - 6t$$

9, max

$$16. f(x) = -x^2 + 10x - 3$$

22, max

$$17. f(x) = 3x^2 + x - 1$$

$\frac{-13}{12}$, min

$$18. g(t) = 5t^2 - 41$$

-41, min

19. **Soccer Ball Kick:** The height $h(t)$, in meters, above the ground of a certain soccer ball kicked t seconds after the ball is kicked can be approximated by $h(t) = -4.9t^2 + 12.8t$. Determine the time for which the ball is in the air. Round to the nearest tenth of a second.

$$t = 2.6 \text{ s}$$

20. **Height of an Arch:** The height of an arch is given by: $h(x) = -\frac{3}{64}x^2 + 27$, $-24 \leq x \leq 24$ where $|x|$ is the horizontal distance in feet from the center of the arch to the ground.

- What is the maximum height of the arch?
- What is the height of the arch 10 feet to the right of center?
- How far from the center is the arch 8 feet tall?

a. 27 feet

b. 22.31 feet

c. 20.1 feet from the center

