

# Vertex Form: Again, Again...

**Recall:** A quadratic function in vertex form can be expressed by:

$$y = a(x - p)^2 + q$$

**Ex. #1:** Graph the equation  $y = 2(x + 3)^2 - 4$  on the grid below and answer the following questions.

Vertex:  $(-3, -4)$

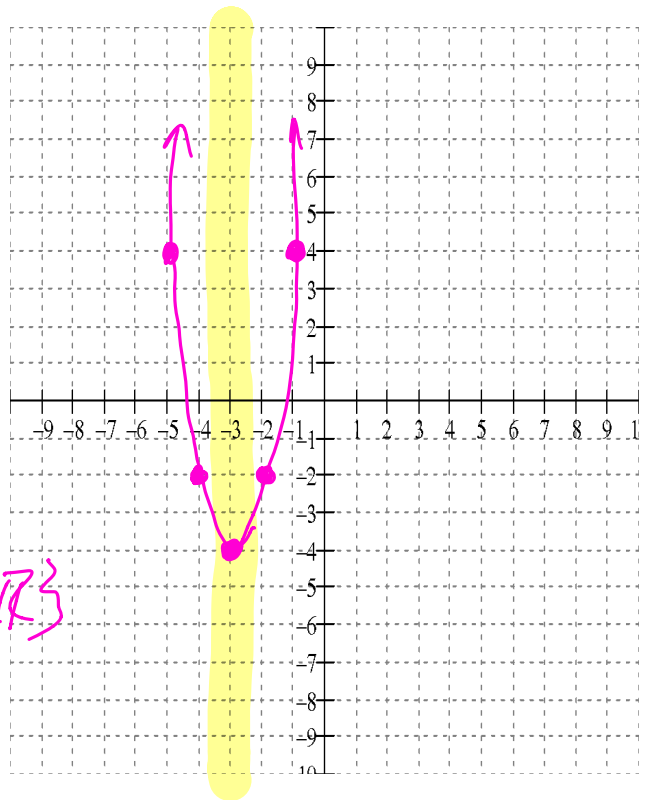
Max or Min: \_\_\_\_\_

Axis of Symmetry:  $x = -3$

Domain:  $\{x \mid x \in \mathbb{R}\}$

Range:  $\{y \mid y \geq -4, y \in \mathbb{R}\}$

Direction of Opening:  $\uparrow$



**Ex. #2:** Graph the equation  $y = -(x - 1)^2 + 1$  on the grid below and answer the following questions.  $y = x^2$

Vertex: (1, 1)

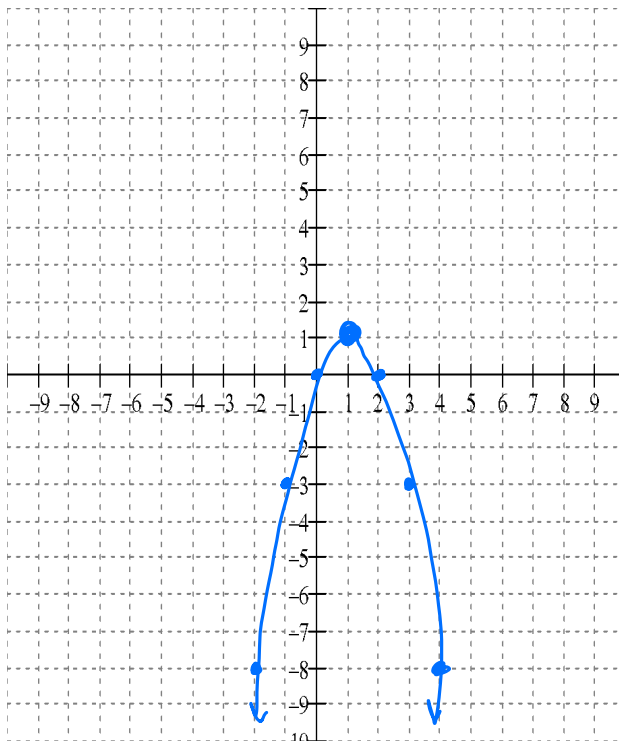
Max or Min: \_\_\_\_\_

Axis of Symmetry:  $x = 1$

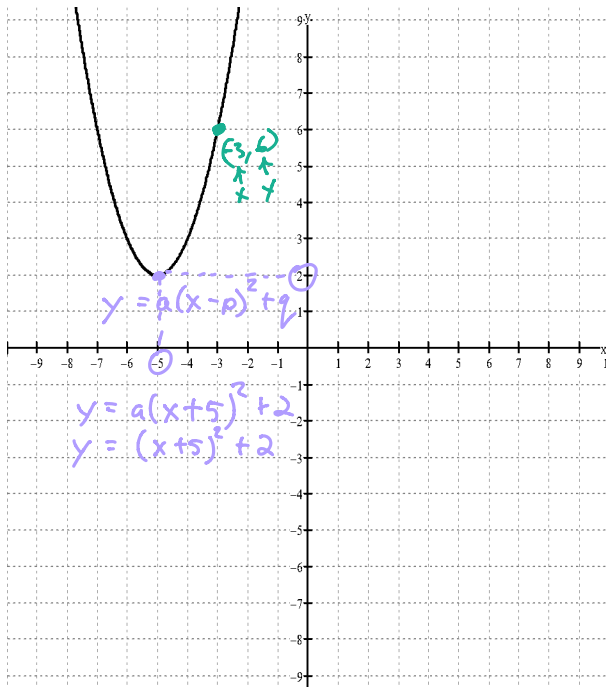
Domain:  $\{x \mid x \in \mathbb{R}\}$

Range:  $\{y \mid y \leq 1, y \in \mathbb{R}\}$

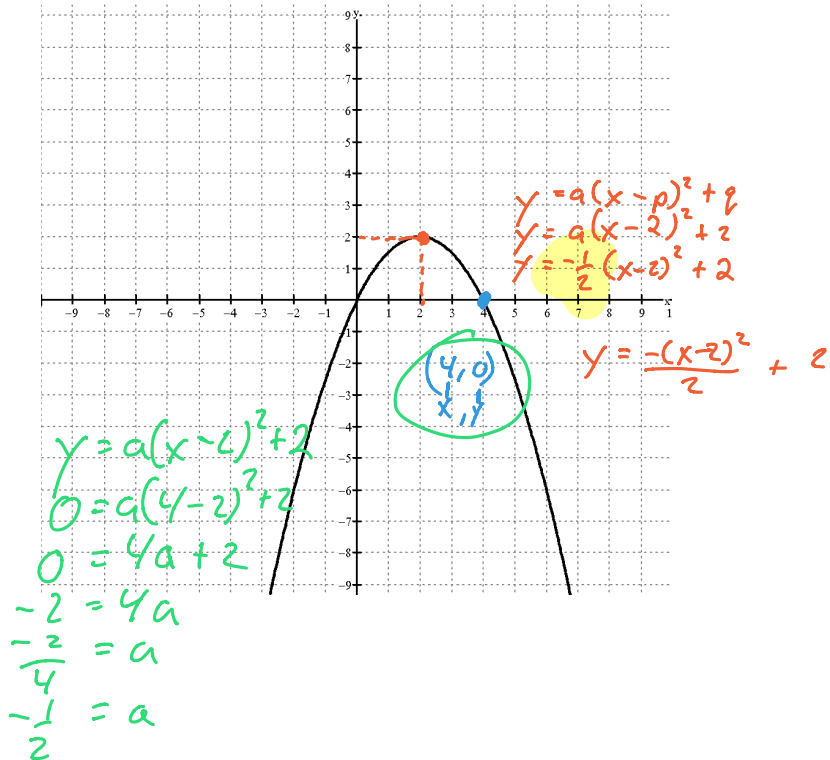
Direction of Opening: Down



**Ex. #3:** State the equation in vertex form for the given graph.



**Ex. #4:** State the equation in vertex form for the given graph.



**Ex. #5:** For the function  $f(x) = -2(x + 6)^2 - 11$  determine each of the following, without graphing.

Vertex:  $(-6, -11)$

Axis of Symmetry:  $x = -6$

Direction of Opening: Down

Max or Min: \_\_\_\_\_

Domain:  $\{x \mid x \in \mathbb{R}\}$

Range:  $\{y \mid y \leq -11, y \in \mathbb{R}\}$