

QF in Vertex form III

Sunday, February 28, 2016 12:20 PM

3.1 Quadratic Functions in Vertex Form: Part III

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: $(-3, -4)$

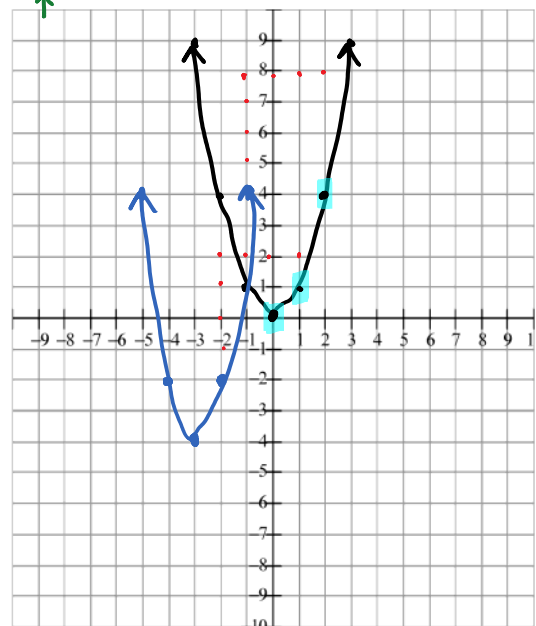
Max or Min: $y = -4$

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: up



Steps: (stretches, reflections, moves)

Pre-Calculus 11

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

Vertex: (1, 1)

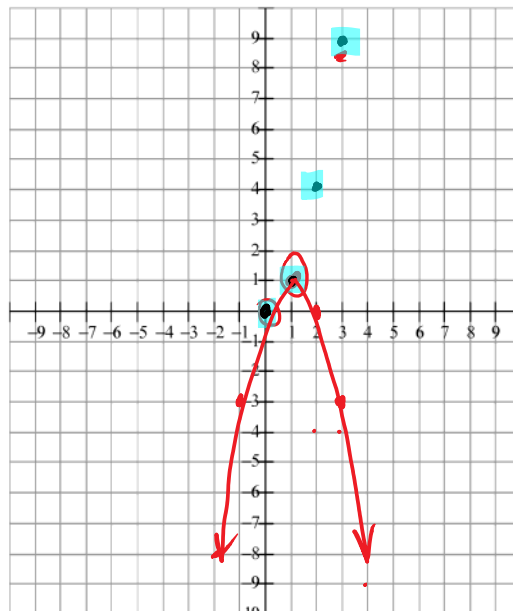
Max or Min: y = 1

Axis of Symmetry: x = 1

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

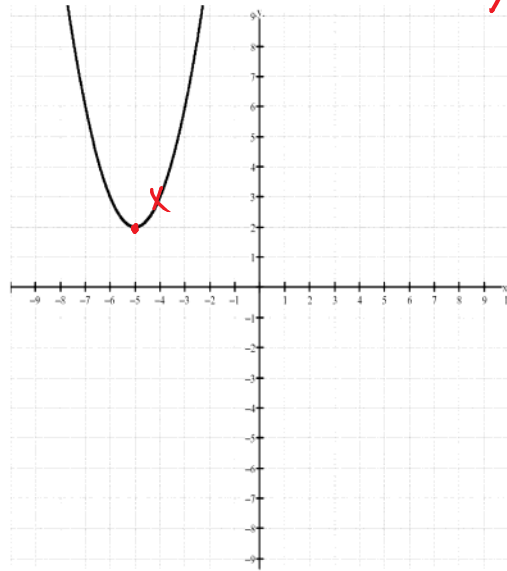
Range: $\{y \mid y \leq 1, y \in \mathbb{R}\}$

Direction of Opening: down



Steps: (stretches, reflections, moves)

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



$$y = a(x - p)^2 + q \quad \text{vertex } (-5, 2)$$

$$\text{pt } (-4, 3)$$

$$y = a(x - (-5))^2 + 2$$

$$y = a(x + 5)^2 + 2$$

$$3 = a(-4 + 5)^2 + 2$$

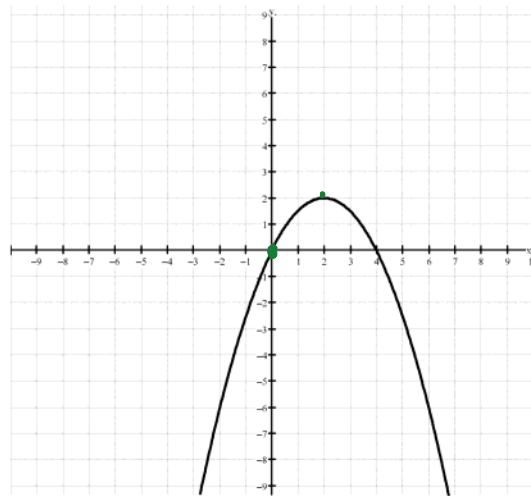
$$3 = a(1)^2 + 2$$

$$3 - 2 = a$$

$$1 = a$$

$$y = f(x) = (x + 5)^2 + 2$$

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



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

$$\text{vertex } (2, 2)$$

$$\text{pt } (0, 0)$$

$$a = -\frac{1}{2}$$

$$y = \frac{(x - 2)^2}{-2} + 2$$

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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: $y = -11$

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

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

Steps: (stretches, reflections, moves)

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

vertex @ (p, q)

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#3 b, c, d
4
7 a, c, d
8
10