Vertex From: Again, Again...

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

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

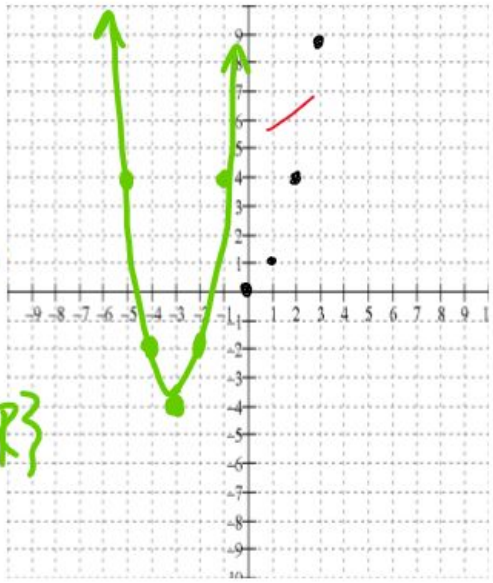
→ up/down

fat/skinny up/down

left/right

p = -3, q = -4, a = 2

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 | x ∈ ℝ}

Range: {y | y ≥ -4, y ∈ ℝ}

Direction of Opening: up

$a = -1 \quad p = 1 \quad q = 1$

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

Vertex: (1, 1)

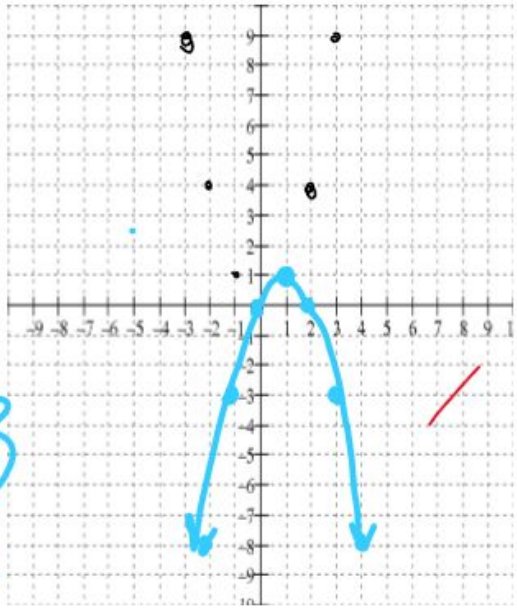
Max or Min: y = 1

Axis of Symmetry: x = 1

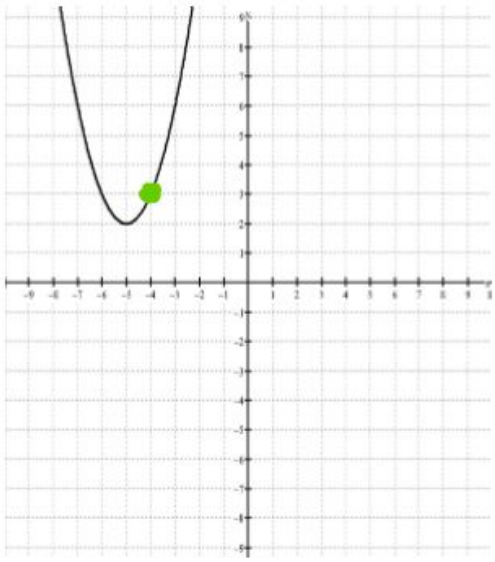
Domain: {x | x ∈ ℝ}

Range: {y | y ≤ 1, y ∈ ℝ}

Direction of Opening: down



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



Vertex (-5, 2)

pt (-4, 3)

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

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

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

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

$3 = a + 2$

$3 - 2 = a$

$1 = a$

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

$a = -2 \quad p = -6 \quad q = -11$

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

HW:

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#3 b, c, d

4

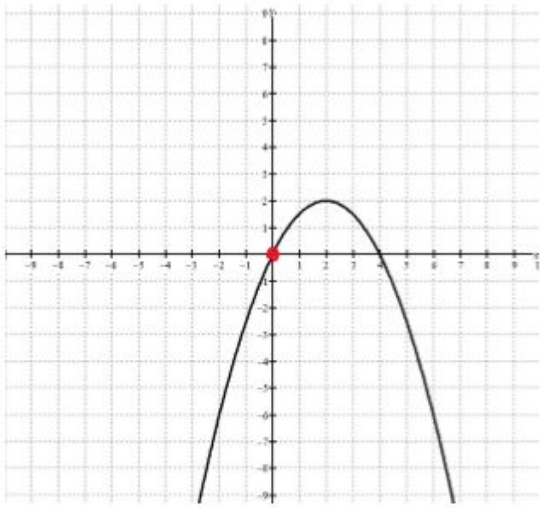
7 a, c, d

8

10

11

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



Vertex $(2, 2)$

pt $(0, 0)$

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