Name: _____

Creating an Equation in Vertex Form

The vertex of a parabola is $(3, -7)$. It also passes through the point $(1, -5)$. State the equation of the quadratic.

1. State the generalization for a quadratic in vertex form.	$y = a(x - h)^2 + k$
2. Substitute the vertex into the generalization for (h, k).	$y = a(x-3)^2 - 7$
3. Substitute the other point that the parabola passes through into the generalization for (x, y).	$-5 = a(1-3)^2 - 7$
4. Solve for the variable a.	$-5 = a(-2)^2 - 7$ $-5 = 4a - 7$ $2 = 4a$ $0.5 = a$
5. Sub the values for a, h, and k into the generalization for vertex form.	$\therefore y = 0.5(x-3)^2 - 7$

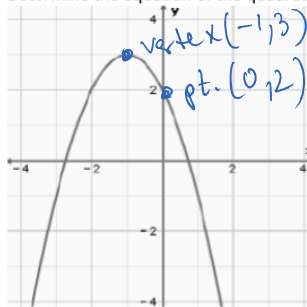## Example 2

Determine the equation of the quadratic relation that passes through the point $(3, 1)$ and has a vertex at $(5, -7)$.

$$y = a(x-h)^2 + k$$
$$y = a(x-5)^2 - 7$$
$$1 = a(3-5)^2 - 7$$
$$1 = a(-2)^2 - 7$$
$$8 = 4a$$
$$2 = a \qquad \therefore y = 2(x-5)^2 - 7$$

Example 3

Determine the equation of the quadratic relation in the graph provided.

vertex $(-1, 3)$

pt. $(0, 2)$

$$y = a(x-h)^2 + k$$
$$y = a(x+1)^2 + 3$$
$$2 = a(0+1)^2 + 3$$
$$2 = a + 3$$
$$-1 = a$$
$$\therefore y = -1(x+1)^2 + 3$$