

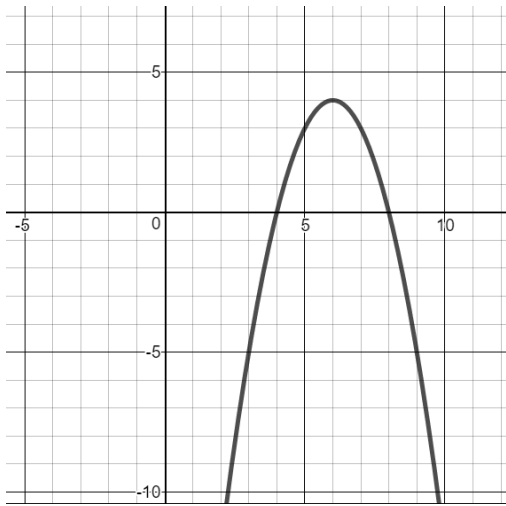
## Quadratics in Vertex Form:

### Writing Equations using Vertex Form

A quadratic can be written in many forms:

- Vertex Form:  $y = a(x - h)^2 + k$
- Transformation Form:  $y = a(bx - c) + d$
- Factor Form:  $y = a(x - b)(x - c)$
- Standard Form:  $y = ax^2 + bx + c$

This station will focus on writing quadratic equations using vertex form  $y = a(x - h)^2 + k$ .



- Start with the general quadratic vertex form  $y = a(x - h)^2 + k$ .
- Find the vertex, in this case  $(6, 4)$ , and substitute it in for  $(h, k)$ .

$$y = a(x - 6)^2 + 4$$

- Next, take any other point from the graph  $(x_1, y_1)$  (not the vertex!) and substitute it in for  $x$  and  $y$  in your equation. Using the point  $(9, -5)$ ,

$$-5 = a(9 - 6)^2 + 4$$

- Finally, solve for  $a$

$$-5 = a(9 - 6)^2 + 4$$

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

$$-5 = 9a + 4$$

$$-9 = 9a$$

$$-1 = a$$

So, the equation for the parabola is  $y = -(x - 6)^2 + 4$ .