

**Find the equation of a parabola that has vertex of  $(-2, -4)$ , and passes through  $(1, 3)$ .**

$$y = a(x - h)^2 + k$$

*Begin with the standard form of a quadratic function.*

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

*Substitute the values of  $h$  and  $k$  in for the vertex of the parabola.*

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

*Simplify, now all you need is the value of  $a$  to complete the equation.*

$$(3) = a((1) + 2)^2 - 4$$

*Since you have the values of  $h$  and  $k$ , you need to find the value of  $a$ , so substitute the values of  $x$  and  $y$  for the point  $(1, 3)$  into the equation.*

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

$$3 = 9a - 4$$

$$7 = 9a$$

*Simplify and solve for  $a$ .*

$$a = \frac{7}{9}$$

$$y = \frac{7}{9}(x + 2)^2 - 4$$

*Once you have found the value of  $a$ , rewrite the completed equation. You have just found the equation of a parabola that has vertex of  $(-2, -4)$ , and passes through  $(1, 3)$ .*

**When you encounter these types of problems the most common mistake people make, is they forget to find the value of  $a$ .**