

## Graphing Quadratic Functions: Vertex Form

Vertex form of a quadratic function is  $f(x) = a(x - h)^2 + k$

Vertex form is much easier to work with than standard form:

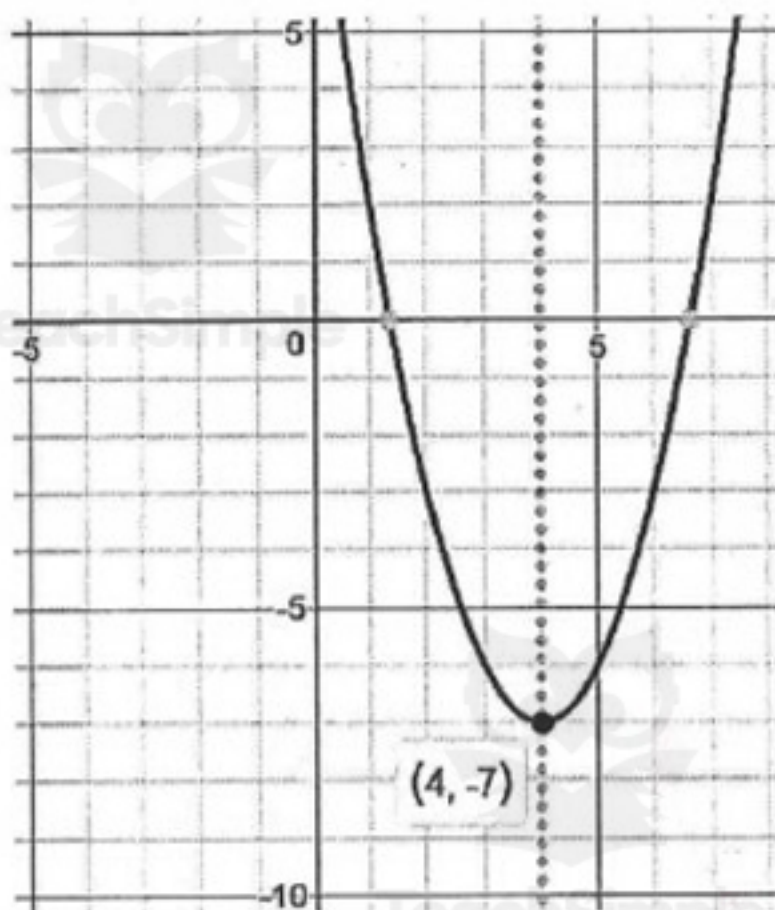
- The *vertex* is  $(h, k)$
- The *line of symmetry* is  $x = h$

The function  $f(x) = x^2 - 8x + 9$  is shown to the right.

In vertex form, it is written  $f(x) = (x - 4)^2 - 7$

Looking at the vertex form of the function...

- The vertex is  $(4, -7)$  ✓
- The line of symmetry is  $x = 4$  ✓



Before we start graphing, let's complete the table below to discover the effects of changing "a"

$f(x) = 7(x - 1)^2 - 1$	$f(x) = \frac{1}{7}(x - 3)^2 - 2$	$f(x) = -7(x + 2)^2 + 5$	$f(x) = -\frac{1}{7}(x - 4)^2 + 3$
$a = 7$	$a = \frac{1}{7}$	$a = -7$	$a = -\frac{1}{7}$
Opens <u>up</u>	Opens <u>up</u>	Opens <u>down</u>	Opens <u>down</u>
Shape: <u>NARROW</u>	Shape: <u>WIDE</u>	Shape: <u>NARROW</u>	Shape: <u>WIDE</u>