Name _____ Date _____ Class _____

LESSON 6-3

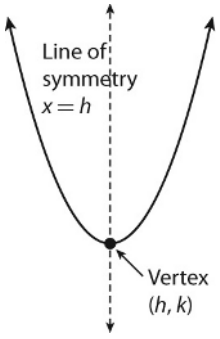
Interpreting Vertex Form and Standard Form

Reteach

The equation of a parabola can be written in either **vertex** or **standard** form.

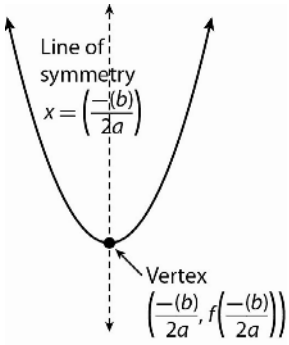
Vertex Form

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



Standard Form

$y = ax^2 + bx + c$



Find the vertex of the quadratic equation $y = 2(x - 1)^2 - 4$.

The **vertex** is the lowest point of a parabola when the parabola opens up.

When the equation is written in vertex form, the coordinates of the vertex are (*h, k*).

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

$y = 2(x - 1)^2 - 4$ $\quad h = 1,\ k = -4$

The vertex is the ordered pair $(1, -4)$ and the line of symmetry is $x = 1$.

To change the equation from vertex form to standard form, do the following:

$y = 2(x - 1)^2 - 4$

$y = 2(x - 1)(x - 1) - 4$ Show the factors.

$y = 2(x^2 - 2x + 1) - 4$ Expand.

$y = 2x^2 - 4x + 2 - 4$ Multiply.

$y = 2x^2 - 4x - 2$ Simplify.

When written in standard form, the coordinates of the vertex are $\left(\frac{-(b)}{2a},\ f\left(\frac{-(b)}{2a}\right)\right)$.

$y = ax^2 + bx + c$

$y = 2x^2 - 4x - 2$ $\quad a = 2,\ b = -4$, so $x = \frac{-(b)}{2a} = \frac{-(-4)}{2(2)} = 1$, and $y = 2(1)^2 - 4(1) - 2 = -4$

The vertex is the ordered pair (1, –4) and the line of symmetry is $x = 1$.

Find the vertex and axis of symmetry of each quadratic equation.

1. $y = (x - 5)^2 + 2$ _____

2. $y = x^2 + 6x + 8$ _____

3. $y = 2(x + 4)^2 + 1$ _____

4. $y = 2x^2 - 12x + 24$ _____

5. $y = 8(x - 9)^2 + 5$ _____

6. $y = 4x^2 + 16x + 1$ _____