EXAMPLE 2 Graph $y = ax^2 + bx + c$

Graph $y = 3x^2 - 6x + 2$.

STEP 1 **Determine** whether the parabola opens up or down. Because $a > 0$, the parabola opens up.

AVOID ERRORS
Be sure to include the negative sign before the fraction when calculating the axis of symmetry.

STEP 2 **Find** and draw the axis of symmetry: $x = -\frac{b}{2a} = -\frac{-6}{2(3)} = 1$.

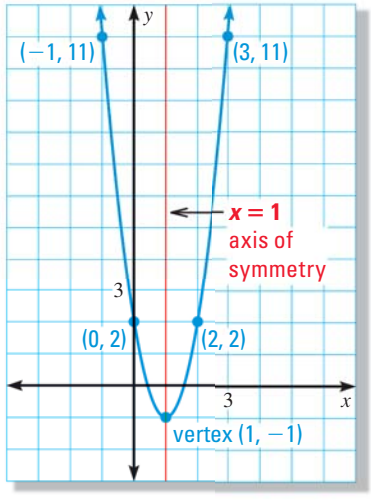
STEP 3 **Find** and plot the vertex.

The x-coordinate of the vertex is $-\frac{b}{2a}$, or 1.

To find the y-coordinate, substitute 1 for x in the function and simplify.

$y = 3(1)^2 - 6(1) + 2 = -1$

So, the vertex is $(1, -1)$.



STEP 4 **Plot** two points. Choose two x-values less than the x-coordinate of the vertex. Then find the corresponding y-values.

x	0	−1
y	2	11

REVIEW REFLECTIONS
For help with reflections, see p. 922.

STEP 5 **Reflect** the points plotted in Step 4 in the axis of symmetry.

STEP 6 **Draw** a parabola through the plotted points.

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GUIDED PRACTICE for Examples 1 and 2

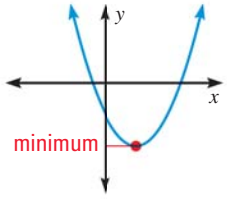
1. Find the axis of symmetry and the vertex of the graph of the function $y = x^2 - 2x - 3$.
2. Graph the function $y = 3x^2 + 12x - 1$. Label the vertex and axis of symmetry.

KEY CONCEPT For Your Notebook

Minimum and Maximum Values

For $y = ax^2 + bx + c$, the y-coordinate of the vertex is the **minimum value** of the function if $a > 0$ or the **maximum value** of the function if $a < 0$.

$y = ax^2 + bx + c$, $a > 0$



$y = ax^2 + bx + c$, $a < 0$