Graphing Quadratic Functions in Standard Form

Name:_______________________________ Date ________________

Example: Graph \( y = x^2 - 4x - 5 \)

Step 1: Find the axis of symmetry

Use \( x = -\frac{b}{2a} \). Substitute 1 for \( a \) and -4 for \( b \).

Simplify

Note: this is a vertical line

Step 2: Find the vertex

The \( x \)-coordinate of the vertex is 2. Substitute 2 for \( x \)

The \( y \)-coordinate is -9. So the point is (2, -9)

Step 3: Find the \( y \)-intercept

Identify \( c \) in the equation \( y = a^2 + bx + (c) \)

So the point is (0, -5)

Step 4: Find two more points on the same side of the axis of symmetry as the point containing the \( y \)-intercept.

Since the axis of symmetry is \( x=2 \), choose values less than 2.

This will allow us to use the symmetry of the parabola to sketch the graph.

Let \( x=1 \)
\[
\begin{align*}
y &= 1^2 - 4(1) - 5 \\
&= 1 - 4 - 5 \\
&= -8
\end{align*}
\]

Two other points are (1, -8) and (-1, 0)

Let \( x=-1 \)
\[
\begin{align*}
y &= (-1)^2 - 4(-1) - 5 \\
&= 1 + 4 - 5 \\
&= 0
\end{align*}
\]

Step 5: Graph the axis of symmetry, the vertex, the point containing the \( y \)-intercept and two other points

Step 6: Reflect the points across the axis of symmetry.

Connect the points with a smooth curve.
Graphing Quadratic Functions in Standard Form Worksheet #1

Name:______________________________________  Period__________ Date _____________

Directions: Graph these equations. Identify the axis of symmetry, vertex, and y-intercept.

1.) \( y = x^2 - 2x - 3 \)

2.) \( y = 3x^2 + 12x + 9 \)

3.) \( y = -x^2 + 6x - 4 \)

4.) \( y = -4x^2 + 8 \)

5.) \( y = \frac{1}{4} x^2 + x - 6 \)

6.) \( y = 2x^2 - 2x - 5 \)