Graphing Quadratic Functions in Standard Form

Name:_____ Date _____

Example: Graph $y = x^2 - 4x - 5$

Step 1: Find the axis of symmetry

$$x = -\frac{-4}{2(1)}$$
$$x = 2$$

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

$$y = x^2 - 4x - 5$$
$$y = 2 - 4(2) - 5$$
$$y = 4 - 8 - 5$$
$$y = -9 \quad (\text{When } x=2)$$

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

$$y = x^2 - 4x - 5$$
$$y = a^2 + bx + (c)$$
$$y = x^2 - 4x + (-5)$$
$$c = -5$$

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.

$$y = x^2 - 4x - 5$$
$$y = a^2 + bx + c$$
$$y = x^2 - 4x + (-5)$$

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

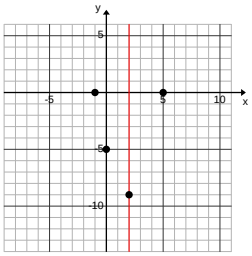
This will allow us to use the symmetry of the parabola to sketch the graph.

Let x=1
$y=1^2 - 4(1) - 5$
=1 -4 -5
=-8

Let x= - 1
y=(-1)2- 4(-1) -5
=1 +4 -5
=0

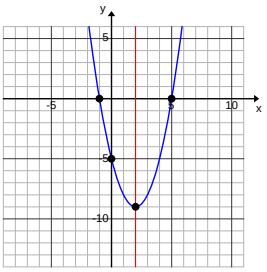
Two other points are (1,-8) and (-1,0)

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.

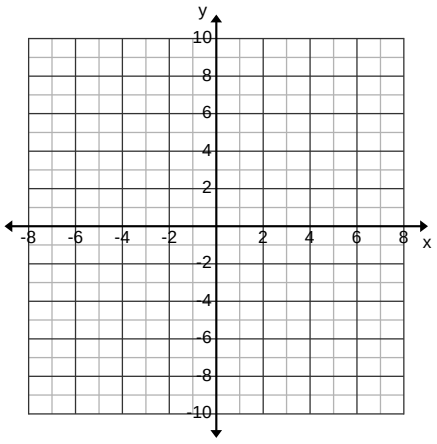


Graphing Quadratic Functions in Standard Form Worksheet #1

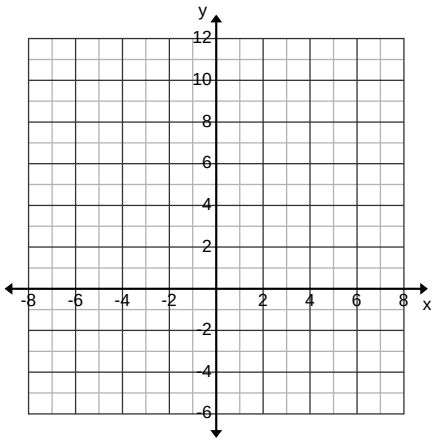
Name:_____ Period_____ Date _____

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

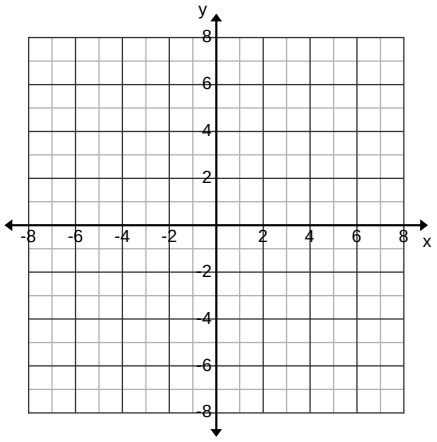
1.) $y = x^2 - 2x - 3$



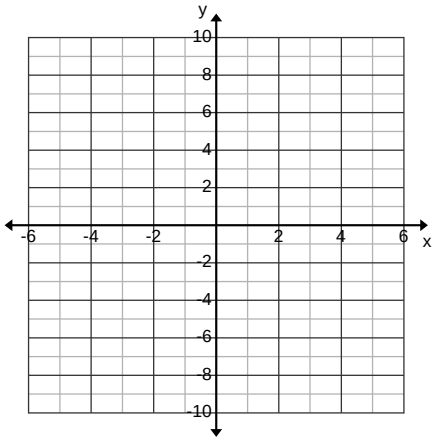
2.) $y = 3x^2 + 12x + 9$



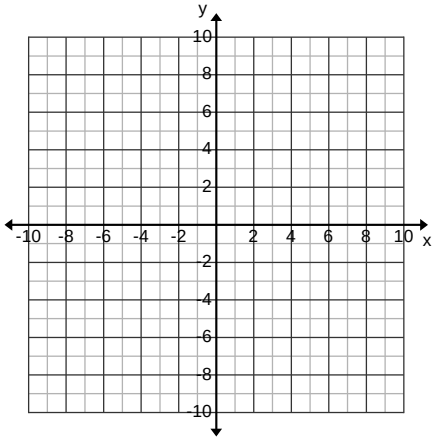
3.) $y = -x^2 + 6x - 4$



4.) $y = -4x^2 + 8$



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



6.) $y = 2x^2 - 2x - 5$