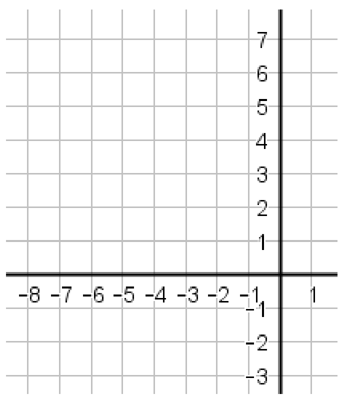
Name: Period: Date:

Math Lab: Graphing Quadratic Equations in Standard Form

What does a tell you about the graph of $y = ax^2 + bx + c$?

1] Sketch the graph of the quadratic equation given in vertex form. Label the coordinate of the vertex, y-int., and use the a-value to find the coordinates of the points one unit to the right and left of the vertex.

$$y = \frac{1}{2}(x+4)^2 - 3$$

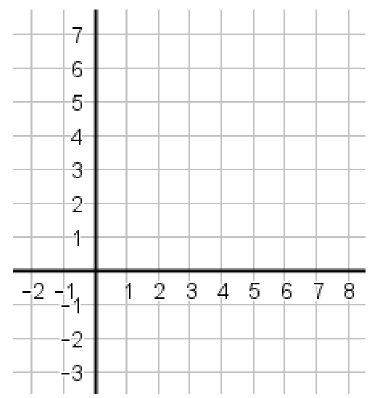


2] Rewrite the equation you just graphed in standard form. Show your work.

$$y = \frac{1}{2}(x+4)^2 - 3$$

3] Sketch the graph of the quadratic equation given in vertex form. Label the coordinate of the vertex, y-int., and use the a-value to find the coordinates of the points one unit to the right and left of the vertex.

$$y = -2(x-3)^2 + 5$$



4] Rewrite the equation you just graphed in standard form. Show your work.

$$y = -2(x-3)^2 + 5$$

5] Does changing the form of the equation from vertex form to the standard form change the ***graph***?

6] Does changing the form of the equation from vertex form to the standard form change the ***a*-value**?

7] Use the graphs you sketched above as a reference to fill in the blanks below for graphing a quadratic function in standard form $\boldsymbol{y = ax^2 + bx + c}$.

- When a is positive, the parabola opens _____ and when a is negative, the parabola opens ________.
- When $|a| < 1$, the graph _________________ and when $|a| > 1$, the graph __________________.
- The slope from the vertex to the next guide point is $\frac{rise}{run} = \frac{\_\_\_\_}{1}$ to the right and left of the vertex.

What does c tell you about the graph of $y = ax^2 + bx + c$?

Recall, that to find the y-intercept you substitute 0 for x and solve for y. Find the y-intercept of each equation below. Show your work.

	What is the y-intercept? (Show your work.)
$y = x^2 - 3$	
$y = \frac{1}{2}x^2 + 5$	
$y = -2x^2 - 4$	
$y = 3x^2 + 3x + 2$	
$y = -x^2 - 2x + 1$	

- The y-intercept of the parabola given in the form $y = ax^2 + bx + c$ is always (0, _____).

What do a and b tell you about the graph of $y = ax^2 + bx + c$?

The 1st column gives you the quadratic equation in vertex form; identify the vertex in the 2nd column. The 3rd column gives you the SAME equation in standard form. Show your work for the calculations in the next two columns in the table. Use those values to answers the questions at the bottom.

Vertex Form $y = a(x-h)^2 + k$	**Vertex**	**Standard Form** $y = ax^2 + bx + c$	$-\frac{b}{2a}$ **(Show your work.)**	**Substitute** $-\frac{b}{2a}$ **in for x in the equation to find y. (Show your work.)**
$y = -(x-2)^2 + 3$		$y = -x^2 + 4x - 1$		
$y = 2(x+3)^2 - 5$		$y = 2x^2 + 12x + 13$		
$y = \frac{1}{2}(x-4)^2$		$y = \frac{1}{2}x^2 - 4x + 8$		
$y = -5x^2 + 10$		$y = -5x^2 + 10$		

- The equation $x = -\frac{b}{2a}$ finds the axis of ____________________ and the x-coordinate of the _______________.
- To find the y-coordinate of the vertex, _____________________________ x back in to $y = ax^2 + bx + c$.