Algebra 1: 11.1 Guided Notes - Part 2 **Name** _____ **Period** _____
Exploring Quadratic Functions

Learning Goals:
Graph a quadratic function of the form $y = ax^2 + bx + c$.
Analyze the standard form of a quadratic function and use it to sketch its graph.

Let's Review

What do we know about the graphs of $y = ax^2$ and $y = ax^2 + c$?

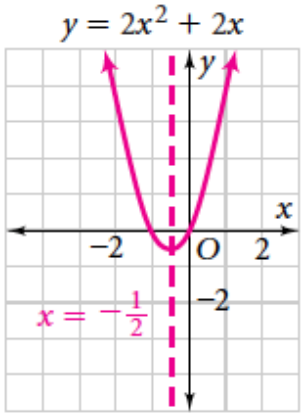
If $a > 0$, the parabola opens UP.	If $\|a\| > 1$, the parabola gets narrower/skinner.
If $a < 0$, the parabola opens DOWN.	If $\|a\| < 1$, the parabola gets wider.

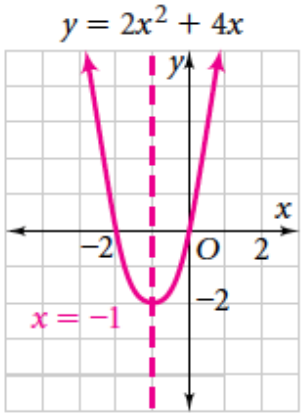
If $c > 0$, the parabola moves UP c units.	If $c < 0$, the parabola moves DOWN c units.

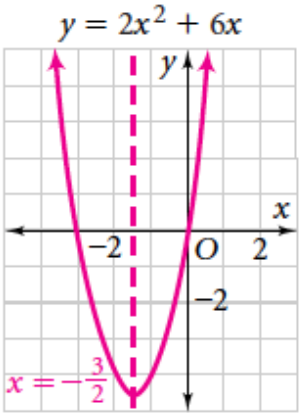
Essential Question

How does the value of b affect the graph? More importantly, how does it change the axis of symmetry?

Consider the graphs of 3 different quadratic functions.







All 3 graphs have the same value for a, a = 2, and the same value for c, c = 0. These graphs also have the same y-intercept, $y = c = 0$.

Only the value of b is different for each quadratic function.

The value of b changes the _____.

Equation for the axis of symmetry is _____. This is also the x-coordinate for the vertex.

Let's calculate the axis of symmetry for each of the quadratic functions listed above.

1) $2x^2 + 2x$ 2) $2x^2 + 4x$ 3) $2x^2 + 6x$

Once you know the axis of symmetry, how do you find the vertex?

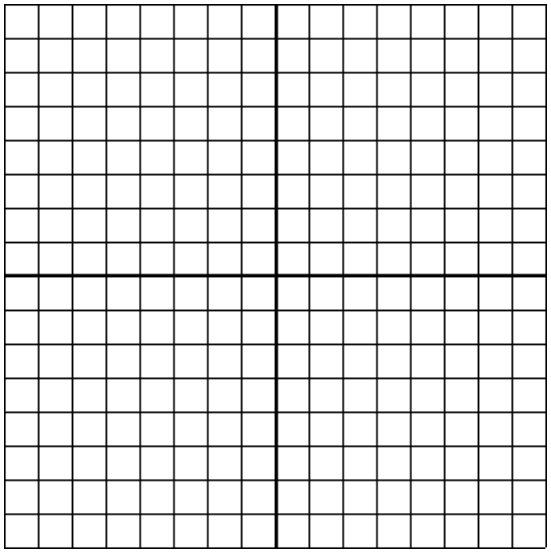
How do you find the y-intercept?

Graphing $y = ax^2 + bx + c$.

Graph the function $y = -3x^2 + 6x + 5$.

Steps:

- Find the axis of symmetry.
- Find the y-coordinate of the vertex by substituting the axis of symmetry for x in the quadratic function.
- Find the y-intercept by letting $x = 0$ in the quadratic function.
- Choose another value for x on the same side of the vertex as the y-intercept.
- Reflect the y-intercept and another point across the axis of symmetry.
- Sketch the parabola.



x	y
-1	
0	
1	
2	
3	

Put the vertex in the middle of the table!