Lesson 2.1.1: Analyzing Quadratic Functions - *Standard Form*

HAHAHAHAHAHAHA!!
PARABOLAS!!!!!!

By the end of this lesson, I will be able to answer the following questions…

1. What is a parabola?

2. What are the characteristics of a parabola?

3. How do I determine the characteristics of a parabola based on the a quadratic equation in standard form?

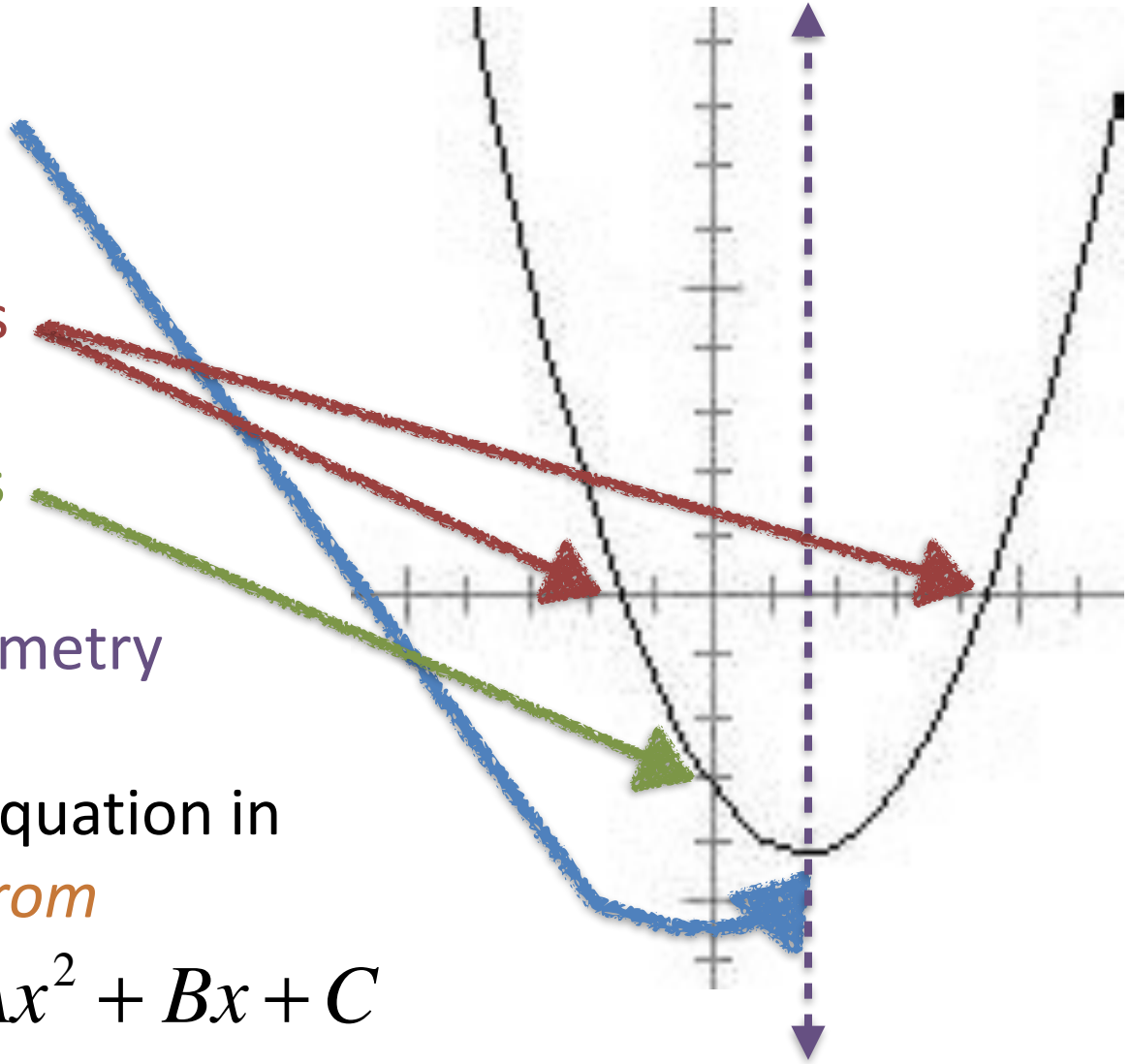
4. How do I graph a parabola based on those characteristics?

5. What do parabolas represent in real life?

Vocabulary

1. Extremum
   - Minimum
   - Maximum
2. X-intercepts
3. Y-intercepts
4. Line of Symmetry
5. Quadratic Equation in *Standard From*

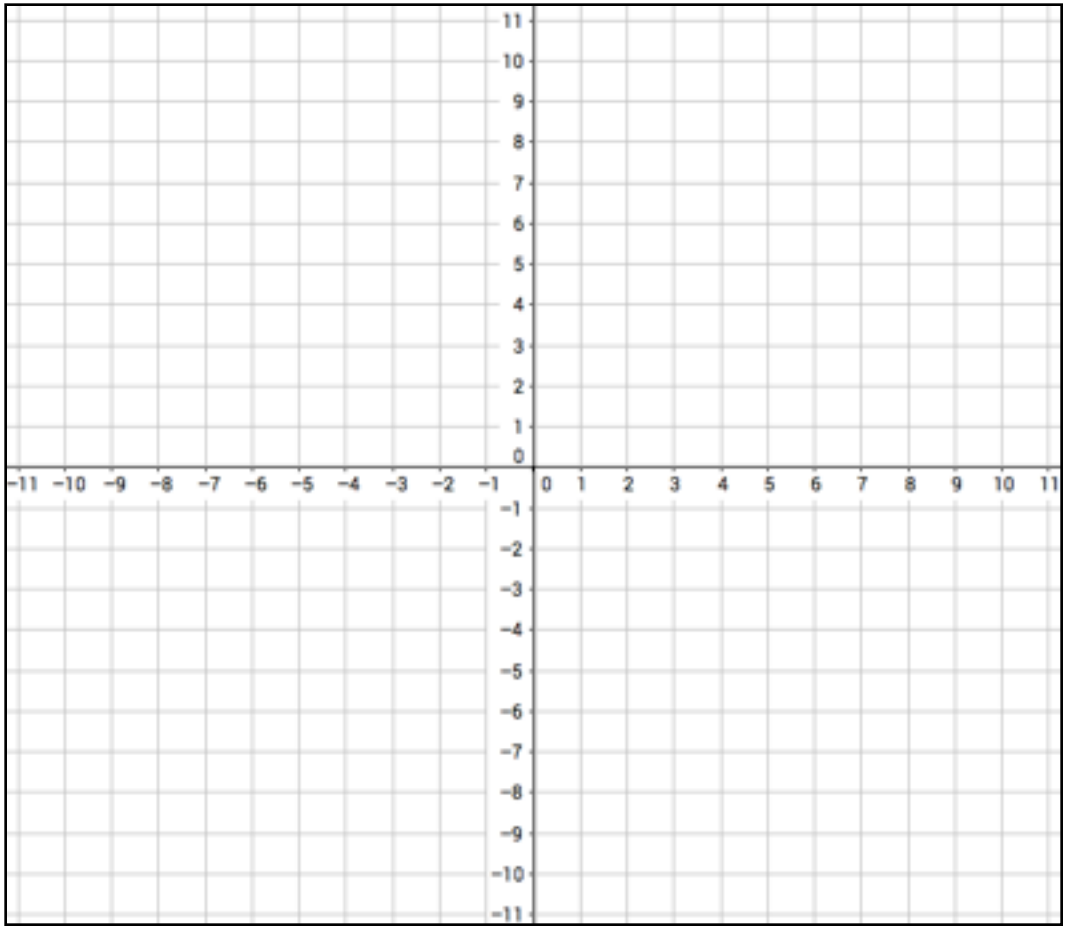
$$f(x) = Ax^2 + Bx + C$$



Prerequisite Skills with Practice

$$f(x) = x^2 - 4x - 5$$

Input	Function	Output
0		
1		
2		
3		
4		
5		
6		
-1		
-2		
-3		



Example One

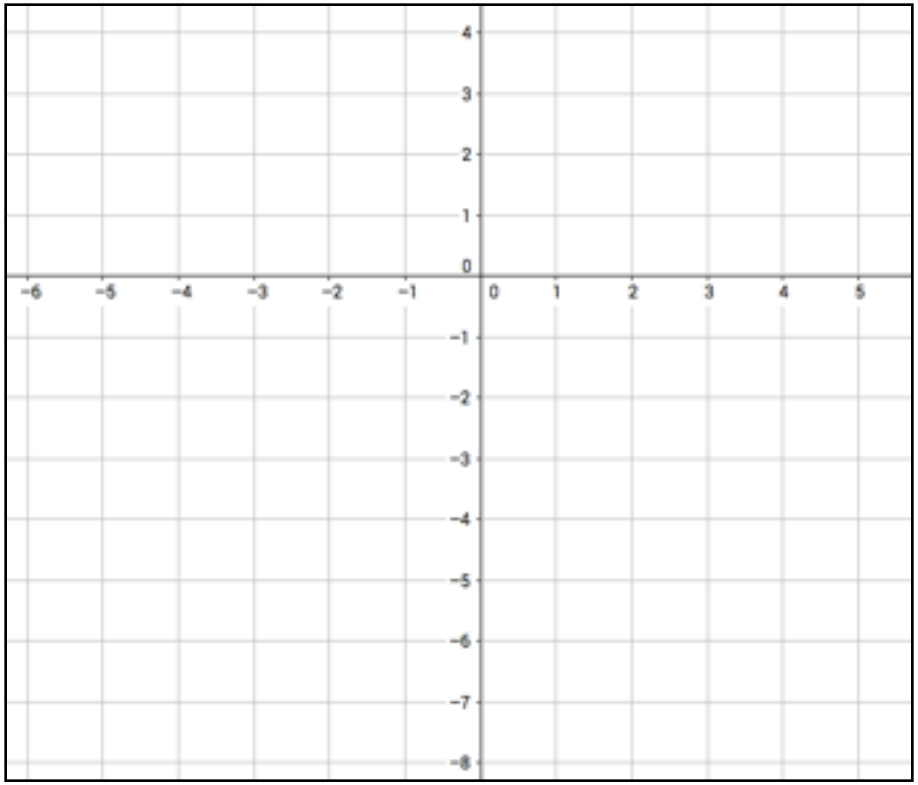
Graphing a parabola using it's vertex, line of symmetry, Y-intercept and strategic points.

Steps:

1. Up or Down?
   - If A is Positive - UP
   - If A is Negative - DOWN
2. Find the vertex.
   - X-value is $\frac{-B}{2A}$
   - Y-value is $f\left(\frac{-B}{2A}\right)$
3. Draw the line of symmetry.
   - x = x value of the vertex
4. Find the y-intercept.
   - Plug 0 in for x.
5. Use strategic points.
   - Nice x values on both sides of the line of symmetry

$$f(x) = Ax^2 + Bx + C$$

$$f(x) = -x^2 - 2x + 3$$



Example Two

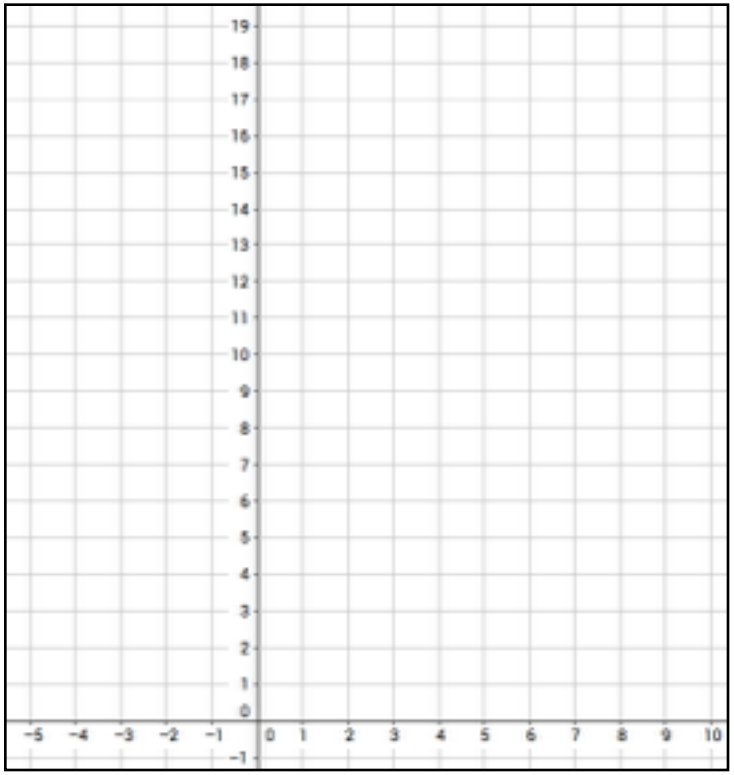
Graphing a parabola using it's vertex, line of symmetry, Y-intercept and strategic points.

Steps:

1. Up or Down?
   - If A is Positive - UP
   - If A is Negative - DOWN
2. Find the vertex.
   - X-value is $\frac{-B}{2A}$
   - Y-value is $f\left(\frac{-B}{2A}\right)$
3. Draw the line of symmetry.
   - x = x value of the vertex
4. Find the y-intercept.
   - Plug 0 in for x.
5. Use strategic points.
   - Nice x values on both sides of the line of symmetry

$$f(x) = Ax^2 + Bx + C$$

$$f(x) = x^2 - 6x + 9$$



Example Three

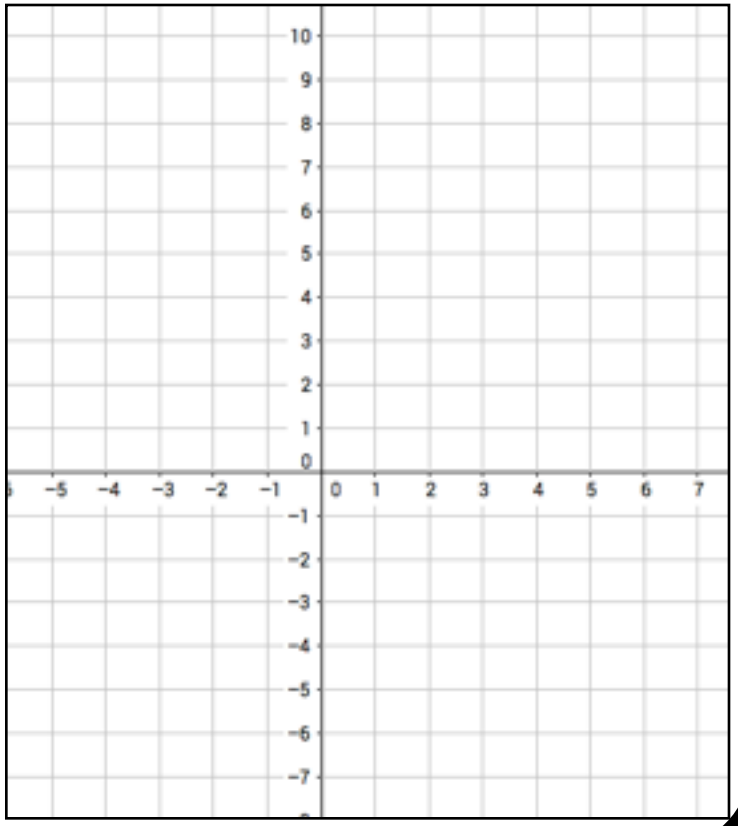
Graphing a parabola using it's vertex, line of symmetry, Y-intercept and strategic points.

Steps:

1. Up or Down?
   - If A is Positive - UP
   - If A is Negative - DOWN
2. Find the vertex.
   - X-value is $\frac{-B}{2A}$
   - Y-value is $f\left(\frac{-B}{2A}\right)$
3. Draw the line of symmetry.
   - x = x value of the vertex
4. Find the y-intercept.
   - Plug 0 in for x.
5. Use strategic points.
   - Nice x values on both sides of the line of symmetry

$$f(x) = Ax^2 + Bx + C$$

$$f(x) = x^2 - 5x$$



Example Four

The flight of a rubber band follows the quadratic equation

$$H(x) = -x^2 + 6x + 7$$

where H(x) represents the height of the rubber band in inches and "x" is the horizontal distance the rubber band travels in inches after launch. Graph the quadratic Equation and reveal the following:

What was the greatest height of the rubber band?

How far did it travel horizontally?

THE END

Visit PlottsMath for assignment details