Exploring quadratic functions (7.1)

Follow the instructions laid out in this worksheet and post your answers in a blog post. Use [www.desmos.com](http://www.desmos.com) to answer the questions below.
**Due: Wednesday Sept 26th**
Title: Exploring quadratic functions
Categorize: Math 11
Tag: quadratics, pahlevanlu

1. Find and write the definition of a quadratic function in words you understand. (use your textbook, google, etc)
* **Quadratic Function**: **A quadratic function is in the form of f(x) = ax2 + bx + c, where a**, **b**, **and c are numbers that are not equal to zero. When this type of equation is graphed on a coordinate plane it makes a U Shape called a parabola. Parabolas may open upward or downward and vary in "width" or "steepness", but they all have the same basic "U" shape.**
1. Give an example of a quadratic function and give an example of a function that is NOT a quadratic.

**Quadratic Function: Y= 10x2 + 15x + 2**

**NOT a Quadratic Function: Y= 9x-4**

1. Go to desmos.com and type in the following function: $y=ax^{2}+bx+c$
	1. Desmos will give you the option of adding “sliders” for $a, b, c$ or all. Click all. This will allow you to change the values of $a, b, c$ to see how the graph changes.
	2. Start with slider values $a=1, b=0, c=0$. Describe any symmetry you notice.
* **The bottom of the line starts at zero. Both sides of the parabola are equal and run through the exact same points.**
1. Keep b = c = 0. Change the value of $a$:
	1. $a<0$
		1. Does the graph open up or open down?

**The graph opened downwards.**

* + 1. Does the graph have a maximum point or minimum point?

 **The maximum point would be zero.**

* 1. $a>0$
		1. Does the graph open up or open down?

**The graph opens upwards.**

* + 1. Does the graph have a maximum point or minimum point?

**The graph would have a minimum point which would be zero.**

* 1. $-1<a<1$
		1. Is the graph narrow or wide?

**The graph is wide.**

* 1. $a>1 or a<-1$
		1. Is the graph narrow or wide?

**The graph is narrow.**

1. We call the maximum or minimum point $(x,y)$ of a quadratic function the **vertex**. Complete the following statements:
	1. When $a$ is **positive** (positive/negative), the vertex is a **minimum** (maximum/minimum)
	2. When $a$ is **negative** (positive/negative), the vertex is a **maximum** (maximum/minimum)
2. Let $a=1$ and $b=0 $constant. Use the slider to change the value of $c. $Describe how the graph changes as $c $changes.

**The parabola goes up and down the y-axis. Once it goes down, it goes into the negatives, so the minimum would change. C represents the y-intercept, so when we change C’s values the y-intercept changes.**

**Roots** are the solutions to the quadratic equation.  The roots are found by looking at where the curve crosses the x axis (x-intercepts).

Adjust the sliders for a, b and c so you can get a curve that just touches the x axis (y=0).

              Equation: **Y= 3.5x2 – 0.9x + 0**

This quadratic equation has ONE solution.

Adjust the sliders so you can get the roots of 0 and -1

              Equation: Y= **-3.9x2 + 3.9X + 0**

This quadratic equation has TWO solutions.

Adjust the sliders so that the curve does NOT cross the x-axis.

              Equation:  **Y= 0.5x2 -0.1x +10**

When the curve does NOT cross the x-axis, there are NO REAL solutions for this equation.