

Name: \_\_\_\_\_ Period: \_\_\_\_\_

Through this activity, you and a partner will use Desmos (an online equation graphing utility) to explore *what happens to different forms of a quadratic equation when certain values are changed*. This type of assignment is very different from others because there is no answer, rather, you and your partner will make observations from your experience and make notes about what you see.

**Goal: See what happens to different expressions when specific values are changed and to understand the value of different forms of quadratic equations.**

### Part 1: Standard form of Quadratic Equations

Go to: <https://www.desmos.com/calculator/mmmx2t24zg>

Instructions	Write what you notice in this column.
<p>Set the sliders to these values: <math>a = 1</math> <math>b = 0</math> <math>c = 0</math></p> <p>Move only slider <math>a</math>, write what you notice and what happens to the graph as you change <math>a</math>.</p>	<p>Student Ans.</p>
<p>Based on your exploration, which values of <math>a</math> make the graph <i>concave up</i> (look like a cup) and which values make the graph <i>concave down</i> (looks like a frown).</p>	<p>Will Vary by</p>
<p>Reset the sliders to these values: <math>a = 1</math> <math>b = 0</math> <math>c = 0</math></p> <p>Move only slider <math>c</math>, write what you notice about what happens to the graph as you change <math>c</math>.</p>	<p>experience.</p>
<p>Set the sliders to these values: <math>a = 0</math> <math>b = 1</math> <math>c = 2</math></p> <p>What do you notice about the graph when <math>a = 0</math>? What happens when you move <math>b</math>? What happens when you move <math>c</math>? How is this similar to what you learned in Alg. 1?</p>	

## Part 2: Factored Form of Quadratic Equations

Go to: <https://www.desmos.com/calculator/8qdwma4in>

Instructions	Write what you notice in this column.
<p>Move the sliders around the page. What do you notice about what happens when the values of <math>p</math> and <math>q</math> are changed?</p>	
<p>Set the sliders to these values: <math>a = 1</math> <math>p = -1</math> <math>q = 1</math></p> <p>Move only slider <math>p</math>, write what you notice about where the graph intersects the <math>x</math>-axis as you change each of the sliders.</p>	
<p>Try moving other sliders around, explain what you need to set for the graph to change directions from <i>concave up</i> (like a cup) to <i>concave down</i> (like a frown).</p>	
<p>What are some things you are <u>wondering</u> after completing Parts 1 and 2?</p>	

### Part 3: Vertex Form of Quadratic Equations

Go to: <https://www.desmos.com/calculator/zqlffoyi55>

**IMPORTANT:** The vertex of a parabola is the highest or lowest point on a curve or graphed function.

Instructions	Write what you notice in this column.
<p>Set the sliders to these values:</p> $a = 1$ $h = 0$ $k = 0$ <p>Move ONLY the <math>h</math> slider. Write what you notice.</p>	
<p>Set the sliders to these values:</p> $a = 1$ $h = -1$ $k = 0$ <p>Move ONLY the <math>k</math> slider. Write what you notice.</p>	
<p>Suppose we give both <math>h</math> and <math>k</math> a new name, what would be better names for <math>h</math> and <math>k</math> that would best describe what they do for the graph of the quadratic?</p>	<p>New name for <math>h</math>: _____</p> <p>New name for <math>k</math>: _____</p>
<p>Manipulate the sliders to get the function to be a straight line.</p> <p>What happens when you move slider <math>h</math> and <math>k</math>?</p> <p>Are you able to make a slanted straight line?</p>	