**The Quadratic Function**

Today we will be investigating what happens when we change the equation of the absolute value function, *y* = *x*2. Go to Desmos.com and complete the questions below with your partner.

**The Parent Function:**

1. The parent function for the family of absolute value functions is *y* = *x*2.

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Graph the function on the grid to the right.

1. The vertex is located at .
2. The axis of symmetry is at .

**Graphing functions of the form** $y=a(x-h)^{2}+k$**.**

1. Use your knowledge of this function form to graph each of the following functions **without Desmos.** When you are done, check your graphs in Desmos and describe how the graph has transformed from the parent function.

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1. y = (x – 1)2 b. y = x2 – 4 y = 2(x – 1)2 - 4

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Vertex: Vertex: Vertex:

Axis of Symmetry: Axis of Symmetry: Axis of Symmetry:

Transformation: Transformation: Transformation:

1. How could you find the vertex of the function **without graphing the function?**
2. What do *a, h* and *k* do in this form?

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**Graphing functions of the form** $y=a(x-p)(x-q)$**.**

1. What do you think the graph of the function

*y* = 2(x + 3)(x + 2) will look like? Sketch it on the plane.

Now use Desmos to graph the function on the same plane. Sketch it in a different color.

1. Graph each of the following functions using Desmos and find its vertex.
2. y = (x + 1)(x – 3) b. y = – (x – 1)(x + 2) c. y = 2(x – 1)(x – 3)

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Vertex: Vertex: Vertex:

Axis of Symmetry: Axis of Symmetry: Axis of Symmetry:

Transformation: Transformation: Transformation:

1. How could you find the vertex of the function **without graphing the function?**



1. What do *a, p* and *q* do in this form?
2. Write an equation for the graph at right. Use whichever form you like.

Why did you choose the form you did? Why?