Desmos Activity Lab **Name** _____
Algebra II **Period** _____

Directions: General Vertex Form for both quadratic and absolute value functions is given below. Graph each equation using Desmos, starting with (A) the parent function. Sketch and label each equation on your paper.

Quadratic Functions:

$y = \pm a(x-h)^2 + k$

Absolute Value Functions:

$y = \pm a|x-h| + k$

Part One: Vertical Translations:

A. $y = x^2$

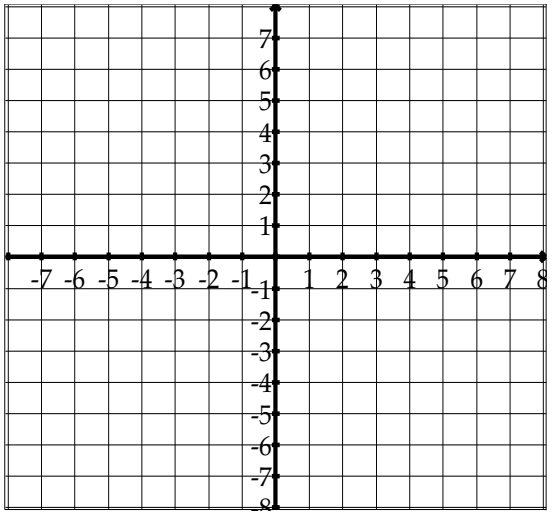
B. $y = x^2 + 3$

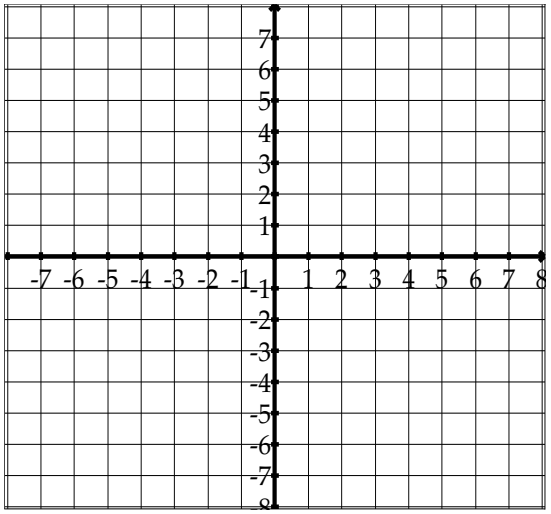
C. $y = x^2 - 3$

A. $y = |x|$

B. $y = |x| + 3$

C. $y = |x| - 3$





Conclusion: What effect does **"k"** have on the parent function graph?

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General Vertex Form

Quadratic Functions:

$y = \pm a(x - h)^2 + k$

Absolute Value Functions:

$y = \pm\, a|x - h| + k$

Part Two: Horizontal Translations:

A. $y = x^2$

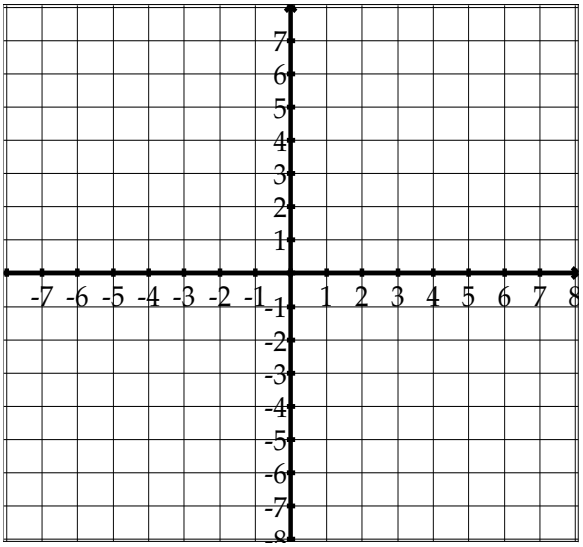
B. $y = (x - 4)^2$

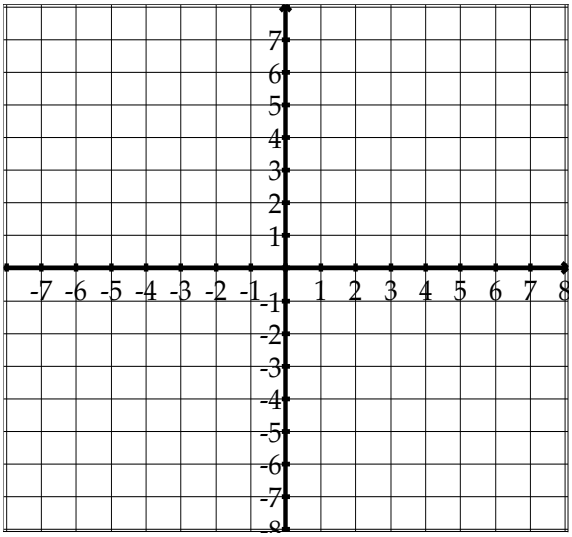
C. $y = (x + 4)^2$

A. $y = |x|$

B. $y = |x - 4|$

C. $y = |x + 4|$





Conclusion: What effect does ***'h'*** have on the parent function graph? Be specific about where the graph moves when ***'h'*** appears to be negative vs. positive.

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Can you guess what special point on the graph is created by the values of ***h & k*** ?

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General Vertex Form

Quadratic Functions:

$y = \pm a(x-h)^2 + k$

Absolute Value Functions:

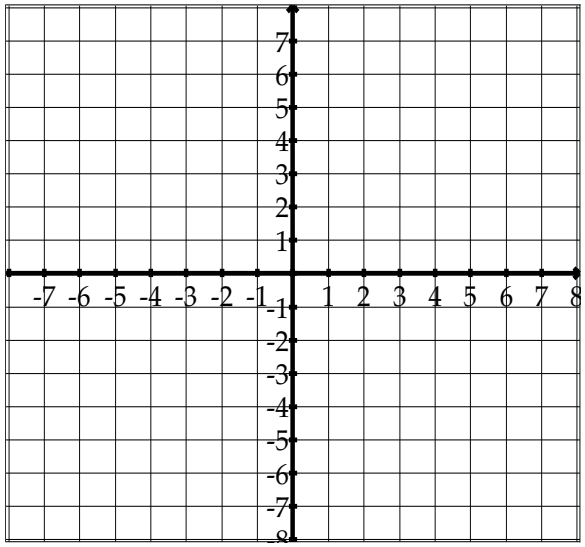
$y = \pm\, a|x-h| + k$

Part Three: Vertical Stretches and Compressions:

A. $y = x^2$

B. $y = 2x^2$

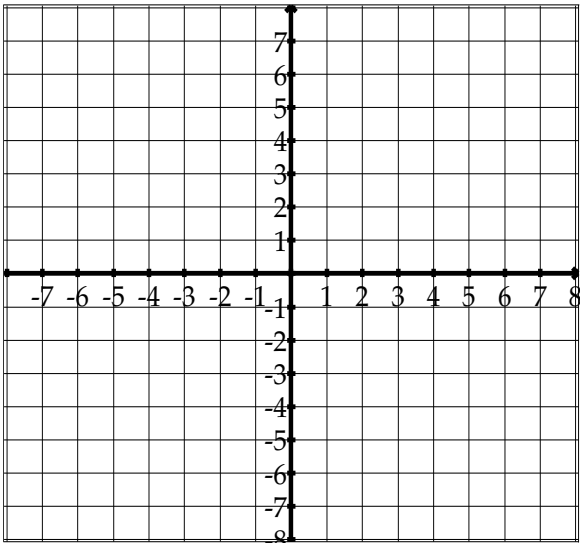
C. $y = \frac{1}{2}x^2$



A. $y = |x|$

B. $y = 2|x|$

C. $y = \frac{1}{2}|x|$



Conclusion: What effect does **'a'** have on the parent function graph? Be specific regarding what happens when the value of 'a' is less than one and when the value of 'a' is greater than one.

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General Vertex Form

Quadratic Functions:

$y = \pm a(x - h)^2 + k$

Absolute Value Functions:

$y = \pm\, a|x - h| + k$

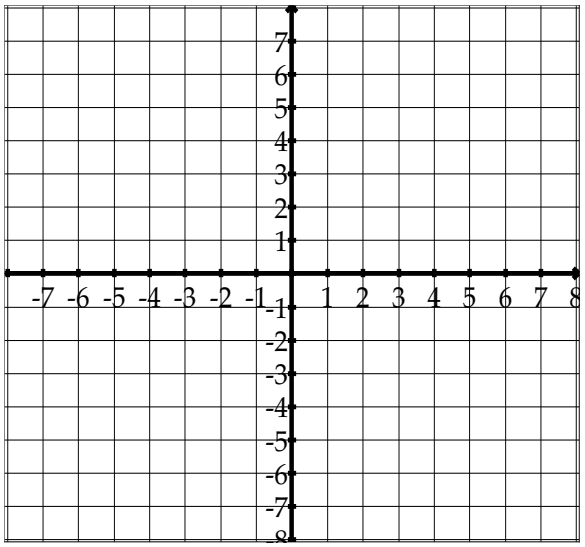
Part Four: Vertical Reflections:

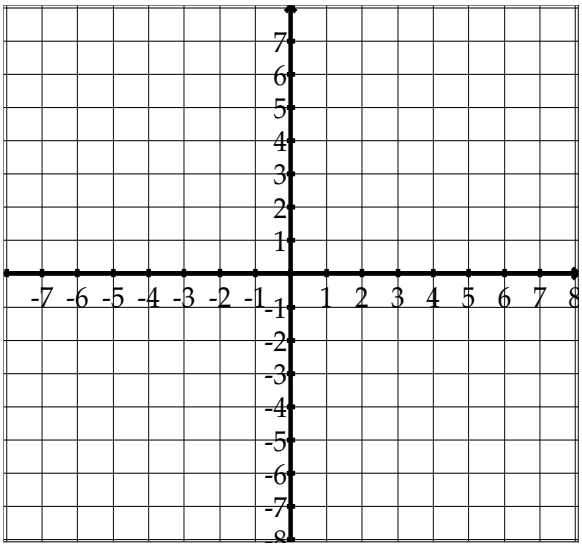
A. $y = x^2$

B. $y = -x^2$

A. $y = |x|$

B. $y = -|x|$





Conclusion: What effect does $\pm a$ have on the graph?

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Stretch: Writing new functions:

Given the parent function: $f(x) = x^2$, can you write a new function, g(x), that represents transformation of the parent function, moving it two units left & four units down, then stretching it vertically by a factor of 5?