Algebra 2 Sec 2-5 Absolute Value Graphs Exploration Fall 2015

$y = |x|$ is called the parent function The graph of $y = |x|$ is a V-shape that opens up. It's vertex is at the origin and the slope of the sides of the V are $+1$(right side) and -1 (left side).

You will explore how the graph of the equation $y = a|x - h| + k$ is related to the graph of the parent function $y = |x|$ and how different values for $a, h,$ and k affect the shape and location of the V.

For all the following steps you will leave $Y_1 = |x|$ and change the equations in Y_2. All graphs should be done in a Standard Window.

To graph $Y_1 = |x|$ press [Y_1] then press [MATH], arrow key once to the right: NUM and choose Option1: abs(Press [X] then [)]. You will see: $Y_1 = abs(x)$. Now you can press [GRAPH] to see the V.

Translations of $y = |x|$

1. Graph $Y_2 = |x + 3|$ How has this graph moved compared to the parent function?

2. Graph $Y_2 = |x - 5|$ How has this graph moved compared to the parent function?

3. What equation would move the graph of $y = |x|$ 7 units to the left?

4. Graph $Y_2 = |x| - 4$ How has this graph moved compared to the parent function?

5. Graph $Y_2 = |x| + 6$ How has this graph moved compared to the parent function?

6. What equation would move the graph of $y = |x|$ 2 units up?

Use each description to write the equation of the absolute value function

7. The parent function $y = |x|$ is moved 4 units right and 6 units down.

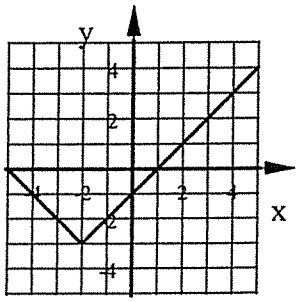
8. The parent function $y = |x|$ is moved 8 units up and 10 units left.

9. The parent function $y = |x|$ and the vertex is $(-7, -5)$

10. State the coordinates of the vertex for each Absolute Value function.

a. $y = |x - 8| + 7$
Vertex:

b. $y = |x + 10| - 9$
Vertex:



11. The graph at the right is a translation of $y = |x|$.
Write the equation of this function.

X-axis Reflection The graph of $y = -|x|$ is a reflection of $y = |x|$ over the x-axis so the graph is an upsidedown "V".

Streches and Shrinks

$y = a|x|$ This equation represents either a strecth (taller) or a shrink (shorter) V-shape.

1. Graph $Y_2 = 7|x|$ How does this graph compare to the parent function $y = |x|$?

2. Graph $Y_2 = \frac{1}{2}|x|$ How does this graph compare to the parent function $y = |x|$?

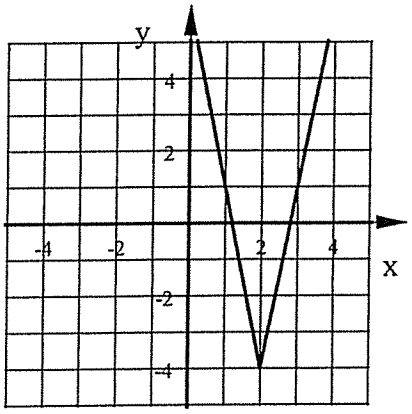
3. Write the equation of an absolute value function that is one-fourth as tall as $y = |x|$

4. Write the equation of an absolute value function that is 3 times taller as $y = |x|$ but opens down.

$y = a|x|$ a also represents the slope of the sides of the absolute value graph.

5. Write the equation of each absolute value function shown below:

a) EQ:



b) EQ: