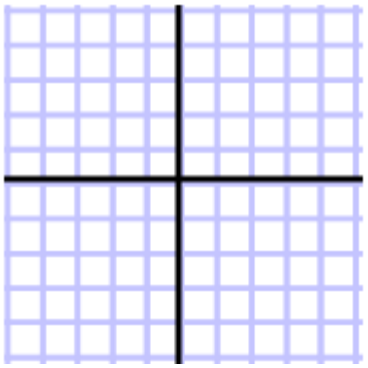
Name_____ **Exploring the Graph of y = a|x – h| + k**

(Absolute Value Function)

Graph the parent absolute value graph **y = |x|** by first completing the table:

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
y											



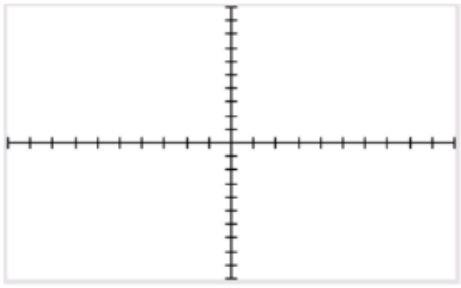
-Does the graph open UP or DOWN?

-Does the graph have a MINIMUM or a MAXIMUM?

-What is the VERTEX of the graph?

This equation can also be written in the form

y = a|x – h| + k where a = 1, h = 0, and k = 0.



Now graph the same equation on the graphing calculator. Sketch the graph on the right. This is the parent graph.

Graph each set of equations <u>one at a time</u>. Clear all graphs when you get to a new set. Complete the table as you graph each equation.

Equation	a	h	k	Opens (Up or Down)	Vertex	Horizontal Shifting (left/right-how much?)	Vertical Shifting (up/down-how much?)	Slope (Compared to Parent Graph)
Set A: y = |x|	1	0	0	Up Down		---	---	Steeper Flatter Same
y = |x|+2				Up Down				Steeper Flatter Same
y = |x| - 3				Up Down				Steeper Flatter Same
y = |x| + 5				Up Down				Steeper Flatter Same
y = |x| - 4				Up Down				Steeper Flatter Same
Set B: y = |x|	1	0	0	Up Down		---	---	Steeper Flatter Same
y = |x+1|				Up Down				Steeper Flatter Same
y = |x - 2|				Up Down				Steeper Flatter Same
y = |x + 6|				Up Down				Steeper Flatter Same
y = |x - 5|				Up Down				Steeper Flatter Same

Set C: $y = \|x\|$	1	0	0	Up Down		---	---	Steeper Flatter Same
$y = 2\|x\|$				Up Down				Steeper Flatter Same
$y = 1.5\|x\|$				Up Down				Steeper Flatter Same
$y = 3\|x\|$				Up Down				Steeper Flatter Same
$y = \frac{1}{2}\|x\|$				Up Down				Steeper Flatter Same
Set D: $y = \|x\|$	1	0	0	Up Down		---	---	Steeper Flatter Same
$y = -\|x\|$				Up Down				Steeper Flatter Same
$y = -2\|x\|$				Up Down				Steeper Flatter Same
$y = -\frac{1}{2}\|x\|$				Up Down				Steeper Flatter Same

Describe how the value of "a" affects the graph. Include descriptions of both positive and negative "a" values.

Describe how the value of "h" affects the graph. Include descriptions of both positive and negative "h" values.

Describe how the value of "k" affects the graph. Include descriptions of both positive and negative "k" values.

Without graphing, describe how each graph compares to the parent graph $y = |x|$. Check using your calculator to see if your description was correct.

a. $y = 2|x - 5| + 7$ b. $y = -2|x + 1| + 3$ c. $y = -|x| - 4$

d. $y = 0.5|x + 2|$ e. $y = 4|x - 5| + 1$ f. $y = \frac{1}{4}|x + 3| - 8$