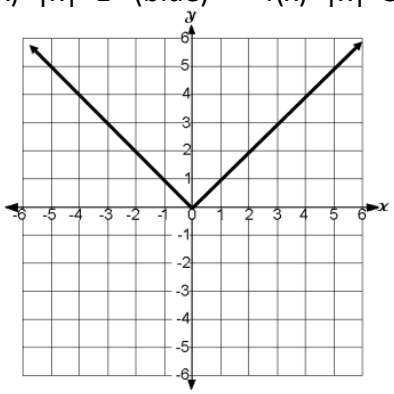
Name: Period: Date:

Math Lab: Absolute Value Graphs

Graph each "family of functions" using a graphing calculator, GeoGebra, or Desmos. Discover what makes each different. Then NEATLY sketch them on the coordinate plane using different colors to differentiate between the function. The parent graph of an absolute value function f(x)=|x| is shown on each graph.

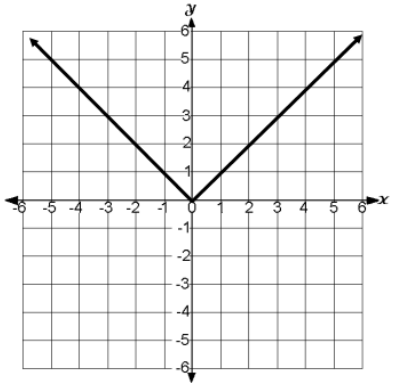
1. f(x)=|x|-1 (red) f(x)=|x|-3 (green)
   f(x)=|x|+1 (blue) f(x)=|x|+3 (purple)



<u>What happens when you add a number outside of the absolute value bars?</u>

<u>What happens when you subtract a number outside of the absolute value bars?</u>

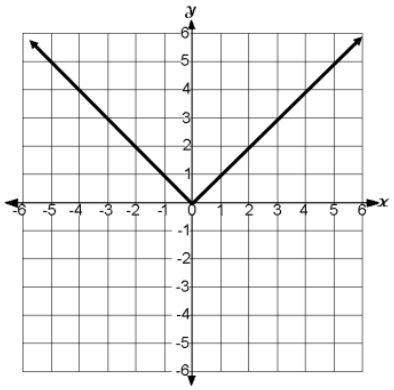
2. f(x)=|x+2| (red) f(x)=|x+4| (green)
   f(x)=|x-2| (blue) f(x)=|x-4| (purple)



<u>What happens when you add a number inside of the absolute value bars?</u>

<u>What happens when you subtract a number inside of the absolute value bars?</u>

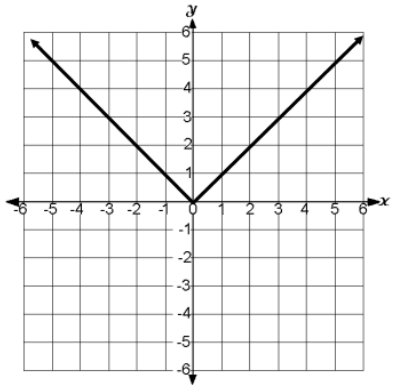
3. f(x)= ½|x| (red) f(x)=2|x| (green)
   f(x)= ⅔|x| (blue) f(x)=4|x| (purple)



<u>What happens when you multiply by a leading coefficient that is less than 1 outside the absolute value bars?</u>

<u>What happens when you multiply by a leading coefficient that is greater than 1 outside the absolute value bars?</u>

4. f(x)= -|x| (red)
   f(x)= |-x| (blue)



What happens when you put a negative sign outside the absolute value signs?

What happens when you put a negative sign inside the absolute value signs?

For each equation below, identify the coordinates of the vertex on the graph. Do this **by looking at the parts of the equation without graphing it**.

5. f(x)=6|x|

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

6. f(x)=|x-8|

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

7. f(x)= -|x+7|

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

8. f(x)=2|x| - 9

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

9. f(x)= - |x|+2

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

10. f(x)=|x - 6|+8

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

11. f(x)= -|x+10|+12

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

12. f(x)= ½|x+7| - 8

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?

13. f(x)= 3|x+1|

vertex: (_____,_____)

Opens up or down?

Narrower, wider, or same?