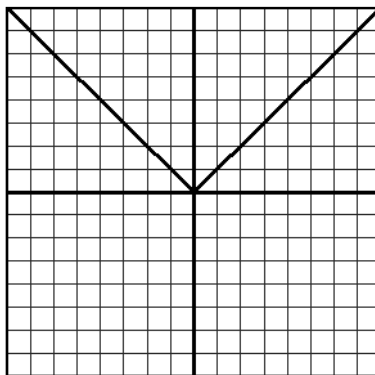


Graphing Absolute Value Equations

College Prep Algebra

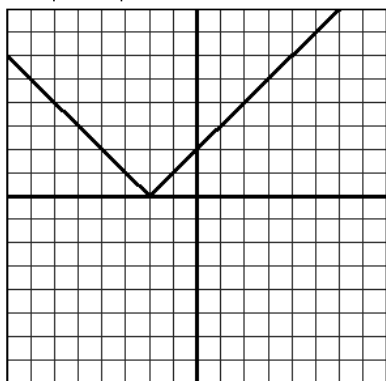
All of the graphs in this activity are based on the equation $y = |x|$. The graph of this function is shown below.

This is called the “parent graph” for $y = |x|$. All graphs for absolute value functions begin with this graph.

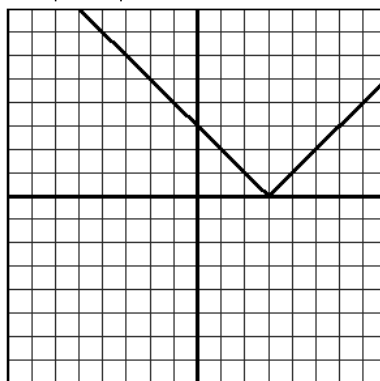


1. Observe the graphs and equations and answer the questions that follow.

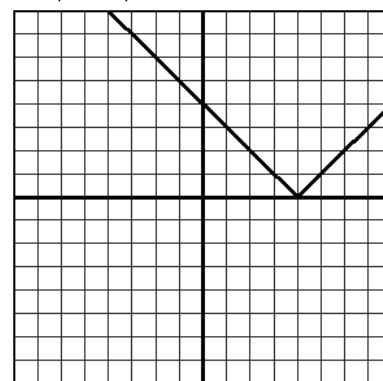
A. $y = |x+2|$



B. $y = |x-3|$



C. $y = |x-4|$



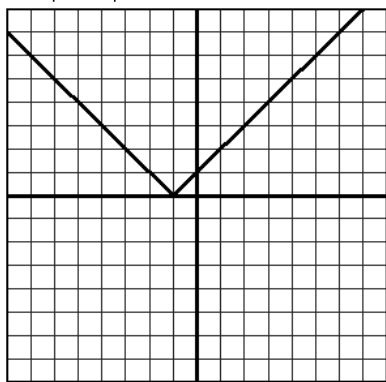
2. Pretend that each of the graphs above began with the parent graph at the top of this page. Describe how these graphs “changed” the graph of $y = |x|$ in the blanks below. Use the word *shift* in your description.

A. _____

B. _____

C. _____

D. $y = |x+1|$



D. _____

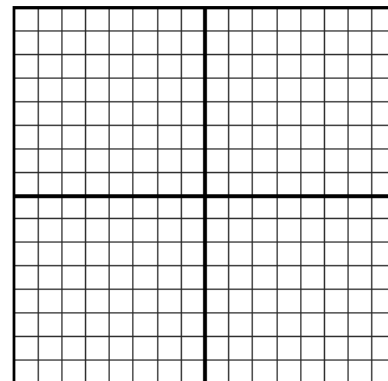
3. **Predict:** How will each graph *shift* for the equations below?

E: $y = |x-1|$ _____

F: $y = |x+3|$ _____

G: $y = |x-2|$ _____

4. **Graph** $y = |x-2|$ without a calculator. Check your answer with a graphing calculator.

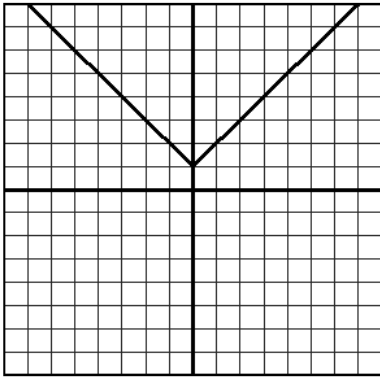


Answer this question during class discussion:

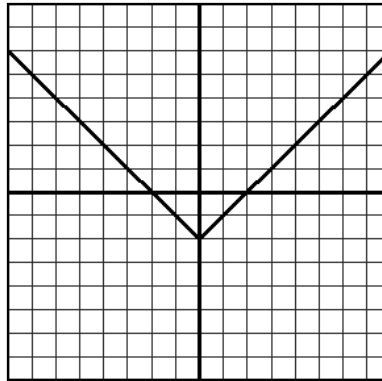
How does the number inside the absolute value, change the graph?

5. Observe the graphs and equations and answer the questions that follow.

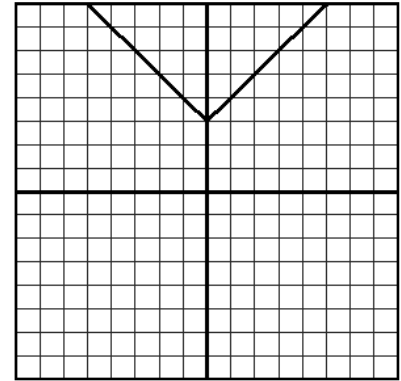
A. $y = |x| + 1$



B. $y = |x| - 2$



C. $y = |x| + 3$



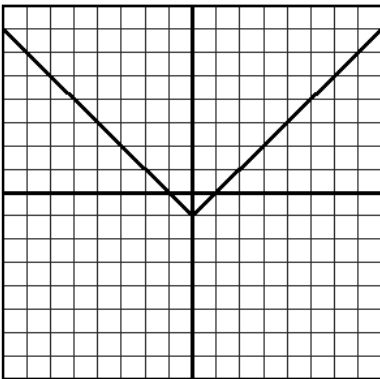
6. Pretend that each of the graphs above began with the parent graph at the top of this page. Describe how these graphs “changed” the graph of $y = |x|$ in the blanks below. Use the word *shift* in your description.

A. _____

B. _____

C. _____

D. $y = |x| - 1$



D. _____

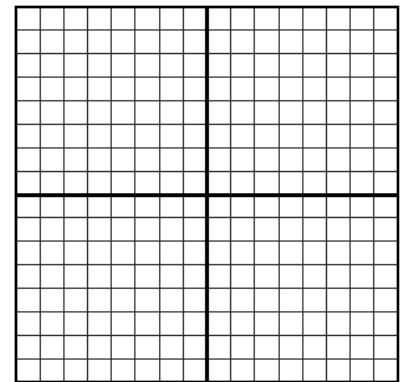
7. **Predict:** How will each graph *shift* for the equations below?

E: $y = |x| + 2$ _____

F: $y = |x| - 4$ _____

G: $y = |x| - 5$ _____

8. **Graph** $y = |x| - 3$ without a calculator. Check your answer with a graphing calculator.

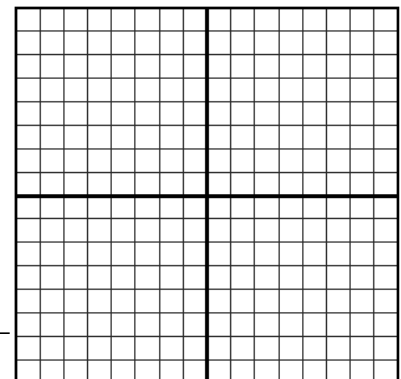


Answer this question during class discussion:

How does the number outside the absolute value, change the graph?

9. What do you think the negative sign in the equation $y = -|x|$ will do to the graph? Use your graphing calculator to check your prediction and draw the graph.

$y = -|x|$



Answer this question during class discussion:

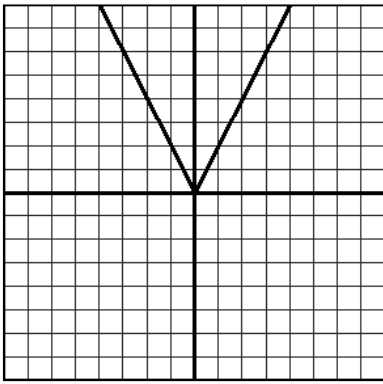
How does the negative sign outside the absolute value, change the graph?

10. Determine the **slopes** of the lines on the right side of each graph. $m =$ _____
 Notice this is the same number in front of all of the absolute values.

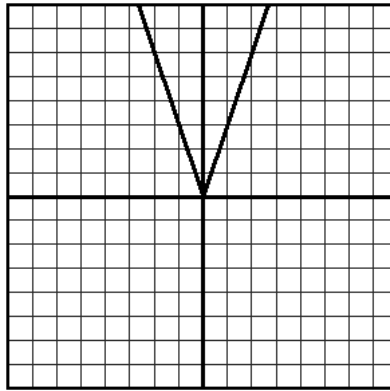
Determine the **slopes** of the lines on the left side of each graph. $m =$ _____
 Notice this is the opposite of the right side.

11. Observe the graphs and equations and answer the questions that follow.

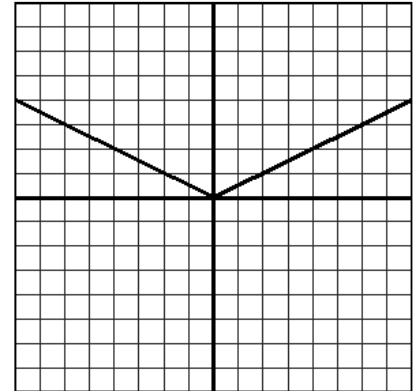
A. $y = 2|x|$



B. $y = 3|x|$



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



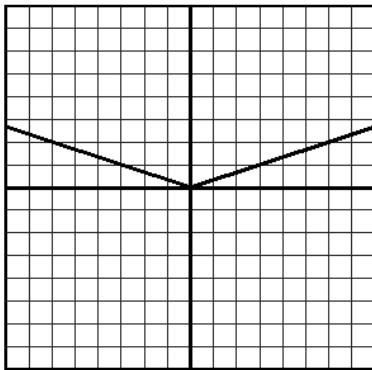
12. Pretend that each of the graphs above began with the parent graph at the top of this page. Describe how these graphs “changed” the graph of $y = |x|$ in the blanks below.

A. _____

B. _____

C. _____

D. $y = \frac{1}{3}|x|$



D. _____

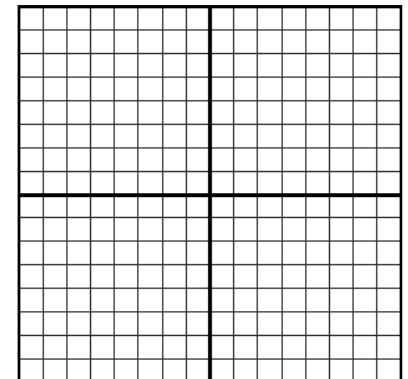
13. A and B above are called *stretches*, while C and D are *shrinks*.

Predict: How will each graph *stretch* or *shrink* below?

E: $y = 6|x|$ _____

F: $y = \frac{1}{4}|x|$ _____

14. **Graph** $y = 4|x|$ without a calculator. Check your answer with a graphing calculator.



Answer this question during class discussion:

How does the number in front of the absolute value, change the graph?

15. Look at the graphs of A, B, and E. What are the *slopes* of the *right* side of each graph?

How does the slope relate to each equation? _____

16. Look at the graphs of C, D, and F. What are the *slopes* of the *right* side of each graph?

How does the slope relate to each equation? _____

17. Describe the **transformations** (changes) for the graphs below. Check your answers on a calculator.

A. $y = |x + 2| - 3$ _____

B. $y = -|x - 3| + 2$ _____

C. $y = 2|x + 1|$ _____

D. $y = \frac{1}{2}|x| - 1$ _____

E. $y = 3|x - 4| + 2$ _____