Algebra 2
2-7 Absolute Value Functions
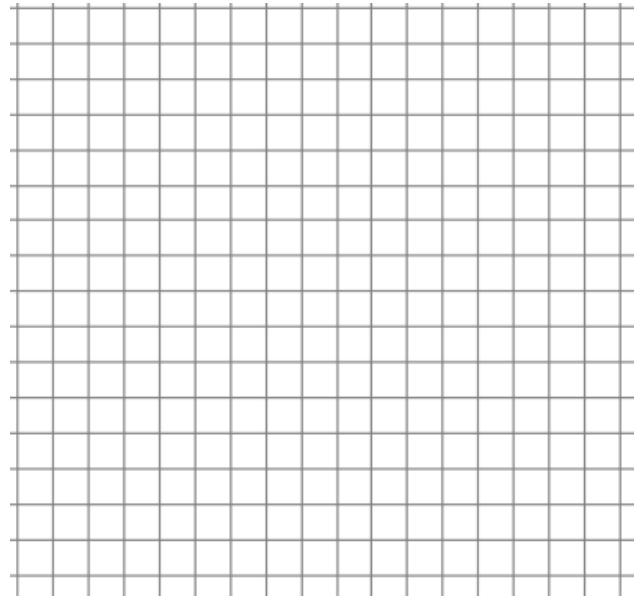
Name _____

Date _____ **A#3**

Goal: Graph absolute value functions.

I. Review: Graph the following functions on the same coordinate plane. Use the table for the first and the slope and intercept for the second.

a. $f(x) = \dfrac{1}{2}x + 3$

x	$f(x) = \dfrac{1}{2}x + 3$
-2	
2	
4	

b. $g(x) = 2x - 4$

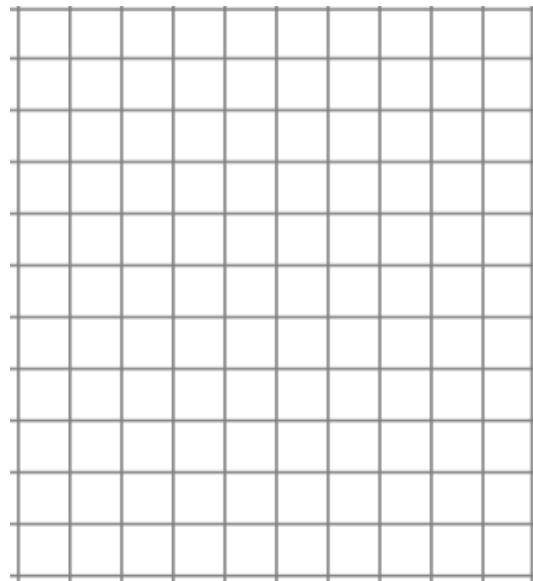Slope: _____

y-intercept: _____

II. Absolute Value Functions: Tables

c. Make a table of values to graph the absolute value function $y = |x|$.

x	$y = |x|$
-2	
-1	
0	
1	
2	

d. Make a table of values to graph the absolute value function $y = |x-2| + 3$.

x	$y = |x-2| + 3$
-1	
0	
1	
2	
3	
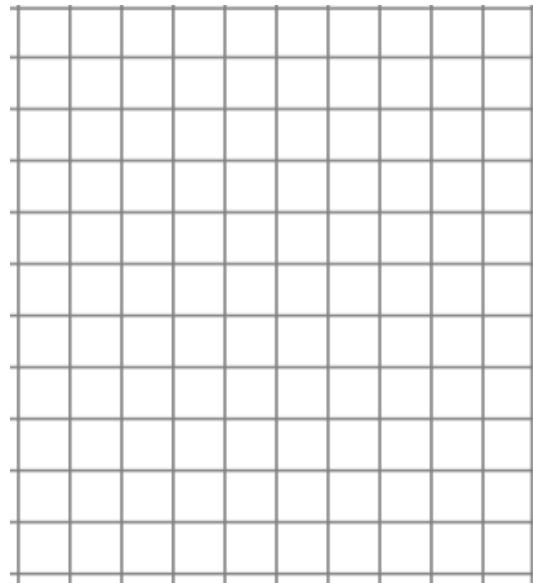
What observations do you make about the two functions and their graphs?

GRAPHING ABSOLUTE VALUE FUNCTIONS
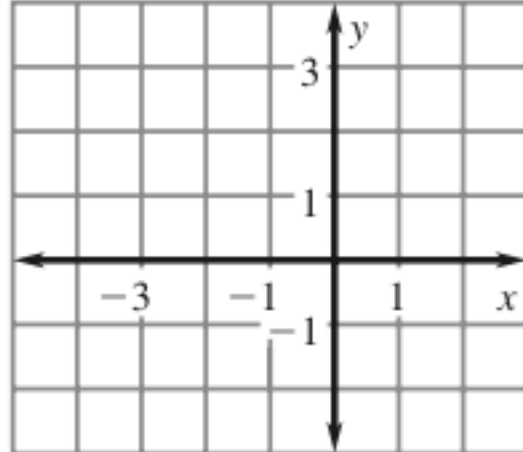
The graph of $y = a|x - h| + k$ has the following characteristics.

- The graph has vertex (___, ___) and is symmetric in the line $x =$ ___.

- The graph is V-shaped. It opens _____ if $a > 0$ and opens _____ if $a < 0$.

- The graph is _____ than the graph of $y = |x|$ if $|a| < 1$.
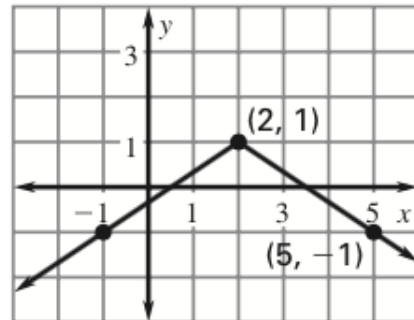
- The graph is _____ than the graph of $y = |x|$ if $|a| > 1$.

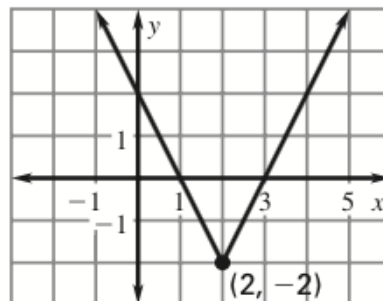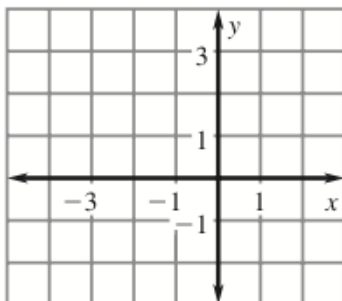### III. Graphing Using Properties

Graph $y = 2|x + 1| - 2$.

IV. Writing Functions from Graphs

Write an equation of the graph shown.

(2, 1)

(5, −1)

1. Graph $y = \dfrac{2}{3}|x + 1| - 1$.

2. Write an equation of the graph shown.

(2, −2)

3

Tell whether the graph of the function opens up or down.

1. $y = |x + 3| - 5$ **2.** $y = -4|x - 1| + 6$ **3.** $y = \frac{2}{3}|x - 2| + 9$

Identify the vertex of the graph of the given function.

4. $y = 2|x + 13| - 6$ **5.** $y = -3|x - 4| - 7$ **6.** $y = \frac{1}{5}|x + 2| + 11$

Tell whether the graph is *wider, narrower,* or the *same width* as the graph of $y = |x|$.

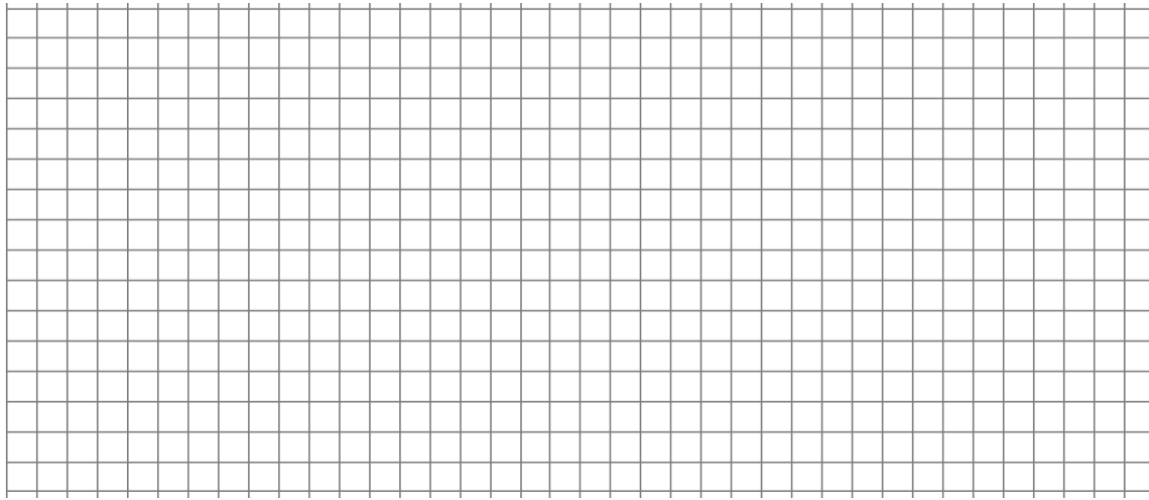**7.** $y = \frac{3}{5}|x - 3| + 7$ **8.** $y = -8|x + 9| - 12$ **9.** $y = -\frac{5}{2}|x - 1| - 3$

Graph the function.

10. $y = |x| - 4$ **11.** $y = |x - 4|$ **12.** $y = |x + 2| - 3$

16. $y = |x - 4| + 5$ **17.** $y = 3|x - 1| - 2$ **18.** $y = -2|x + 7| - 4$