

Name: _____

Date: _____

Absolute Value Algebra 1

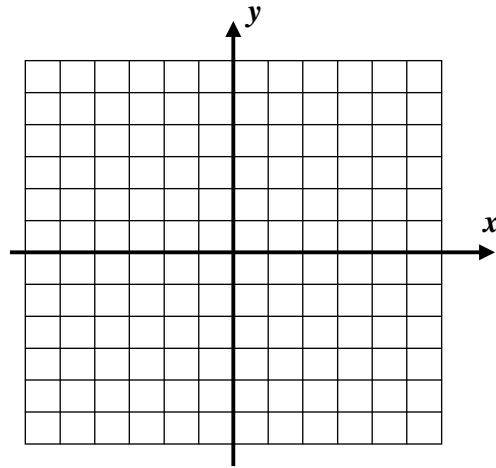
In Unit #1, we talked about **absolute value** in terms of the distance a number is away from zero on a number line. We will now investigate the graph of the absolute value function.

Exercise #1: Consider the function $y = |x|$.

(a) Without the use of your calculator, fill in the table below for this function.

x	$y = x $
-6	
-4	
-2	
0	
2	
4	
6	

(b) Graph the function on the grid below.



(c) Find the slope of the graph for each of the intervals stated below:

$$x < 0$$

$$x > 0$$

Exercise #2: Fill in the two blanks in the definition box below.

ALGEBRAIC DEFINITION OF ABSOLUTE VALUE

$$y = |x| = \begin{cases} \underline{\hspace{2cm}} & x \geq 0 \\ \underline{\hspace{2cm}} & x < 0 \end{cases}$$

Exercise #3: Use the definition above to find the absolute value in each case below.

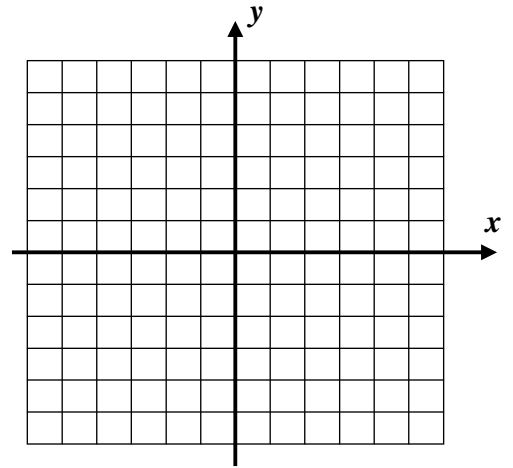
(a) $|5| =$

(b) $|-12| =$

(c) $|0| =$

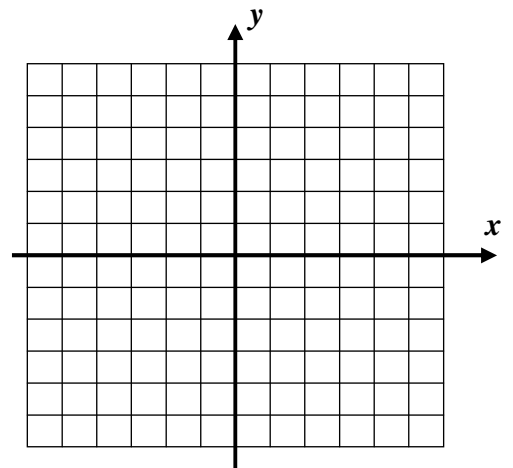
Exercise #4: Consider the function $y = |x + 2| - 3$.

- (a) Using your graphing calculator to generate an xy -table, graph this function on the given grid.
- (b) State the coordinates of the **turning point** of this absolute value function.
- (c) How was the graph of $y = |x|$ shifted to produce the graph of this function?



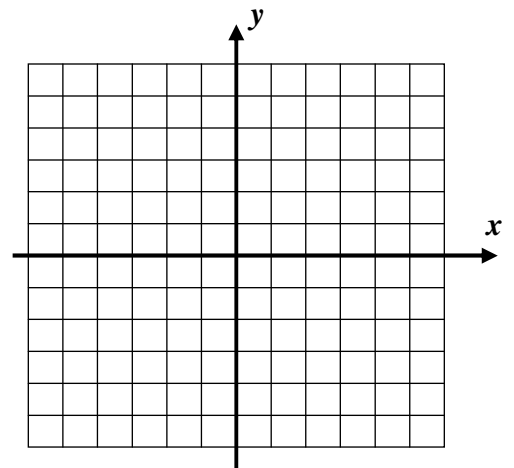
Exercise #5: Consider the function $y = |x - 3| + 1$.

- (a) Using your graphing calculator to generate an xy -table, graph this function on the given grid.
- (b) State the coordinates of the **turning point** of this absolute value function.
- (c) How was the graph of $y = |x|$ shifted to produce the graph of this function?



Exercise #6: Consider the function $y = -|x|$.

- (a) Using a calculator to generate an xy -table, graph the function on the grid to the right.
- (b) How has the graph of $y = |x|$ been transformed to form the graph of $y = -|x|$?



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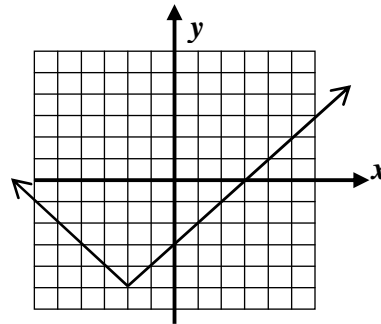
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Absolute Value Algebra 1 Homework

Skills

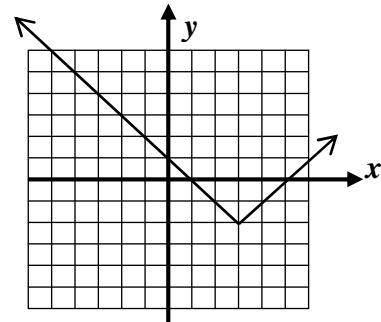
1. Which equation describes the graph shown below?

- (1) $y = |x + 2| - 5$ (3) $y = |x - 2| - 5$
 (2) $y = |x + 5| + 2$ (4) $y = |x - 5| - 2$



2. Which equation describes the graph shown below?

- (1) $y = |x + 3| - 2$ (3) $y = |x - 3| - 2$
 (2) $y = |x - 2| - 3$ (4) $y = |x + 2| + 3$



3. Lorraine entered an absolute value function in her graphing calculator and produced the table shown below. What are the coordinates of the turning point of this absolute value function?

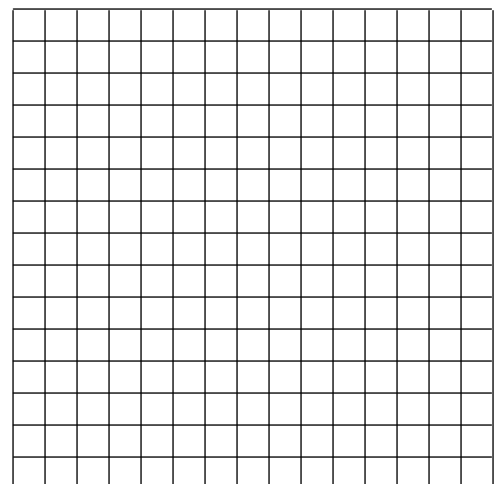
- (1) (1, 1) (3) (-3, 5)
 (2) (7, -1) (4) (5, -3)

X	Y1	
-1	1	
0	0	
1	1	
2	0	
3	1	
4	0	
5	1	
6	0	
7	1	

4. Consider the function $y = |x - 4| - 3$.

(a) What are the coordinates of the turning point of this function?

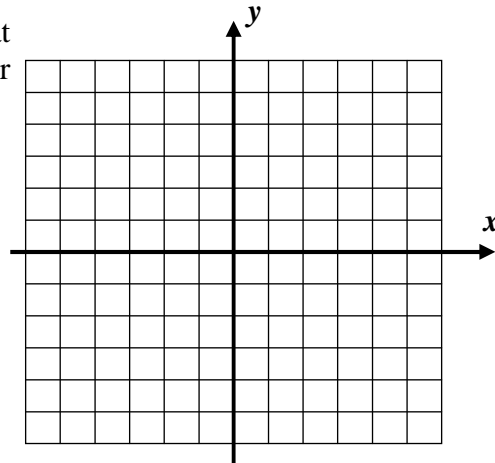
(b) Graph the function on the grid provided. Place your axes on the grid in such a way that you graph at least 5 integer x -values greater than and less than the turning point's x -coordinate.



Applications

5. The roof of a tent above flat ground can be modeled by the equation $y = -|x| + 4$, where x represents the horizontal position from the center of the tent and y represents the tent's height. Both variables have units of *feet*.

(a) Graph this equation on the grid to the right. Only graph that portion that represents the tent's height at ground level or above.



(b) What is the maximum height of the roof above the ground? Include units.

(c) What is the width of the tent? Include units.

Reasoning

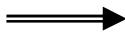
6. Consider the absolute value functions $y = |x - 6| + 3$ and $y = |x - 14| + 20$.

(a) Enter these functions as **Y1** and **Y2**, respectively, in your calculator.

(b) Graph these functions by using the **STANDARD ZOOM WINDOW**.

```

ZOOM MEMORY
1:ZBox
2:Zoom In
3:Zoom Out
4:ZDecimal
5:ZSquare
6:ZStandard
7↓ZTrig
    
```



```

WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1
    
```

(c) The graph of only one of these two functions is shown in this viewing window. Write the equation of the one that is drawn.

(d) Explain why the graph of the other absolute value function does not appear in this viewing window.