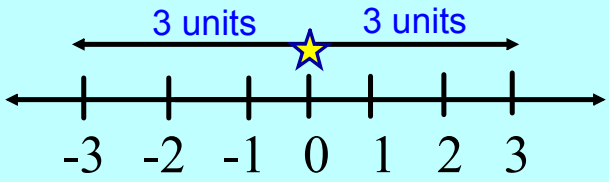
Absolute Value Functions

The absolute value represents its distance from zero on a number line.



The symbol for absolute value is: " | | ".

Examples:

$|4| = 4$

$|-4| = 4$

$|3.2| = 3.2$

$|-x| = x$

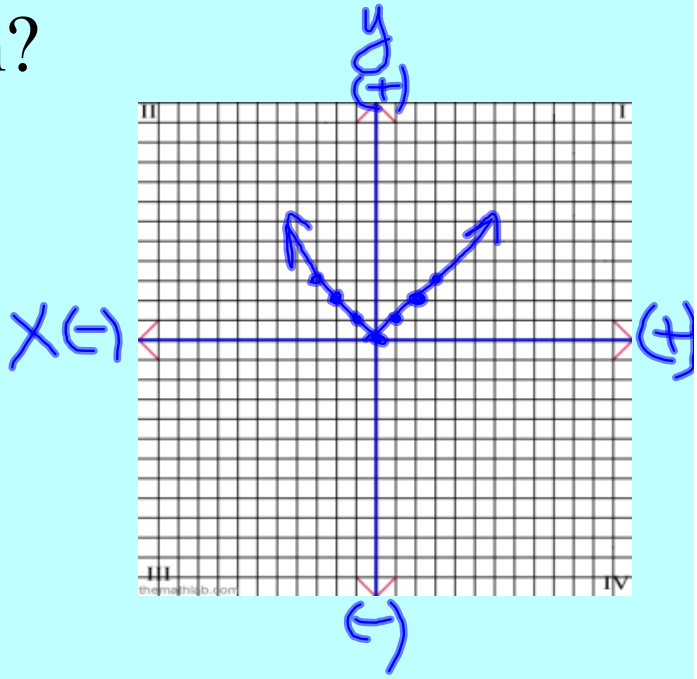
The absolute value is **always** the **positive** value!

How do you graph an absolute value graph?

$$y = |x|$$

x	y
-2	2
-1	1
0	0
1	1
2	2

Over	Up
1	1
2	2
3	3



What is a Vertex??
- The vertex is where the graph changes direction.

Vertex : (0,0) **Dir:** Up

a) $y = |x - 1| + 4$

x	y
-2	7
-1	6
0	5
1	4
2	5

Vertex: (1, 4)

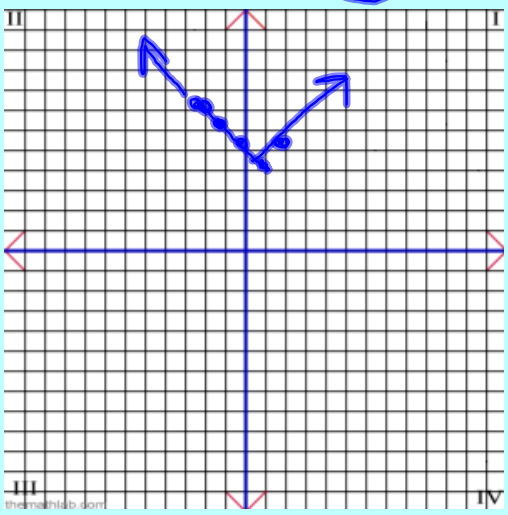
Dir: up

$y = |2 - 1| + 4$

$= |1| + 4$

$= 1 + 4$

$= 5$

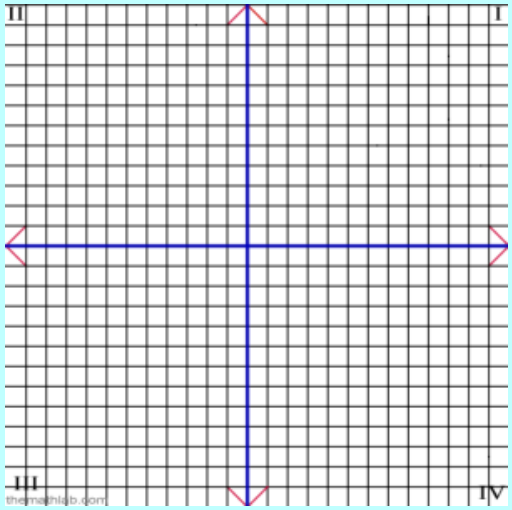


b) $y = |x + 3| - 2$

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

Vertex:

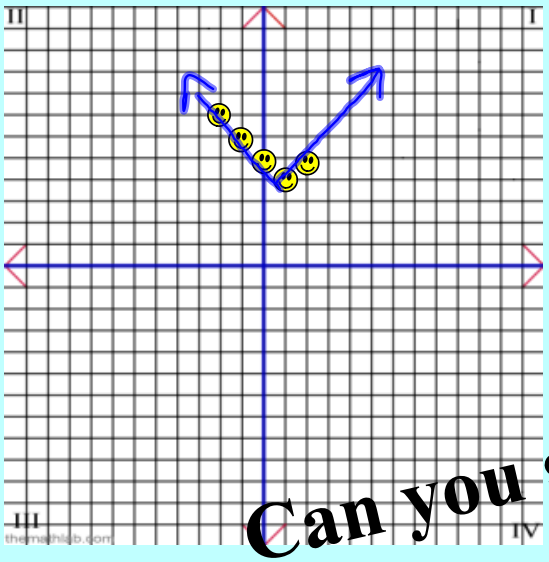
Dir:



$$y = |x - 1| + 4$$

x	y
-2	7
-1	6
0	5
1	4
2	5

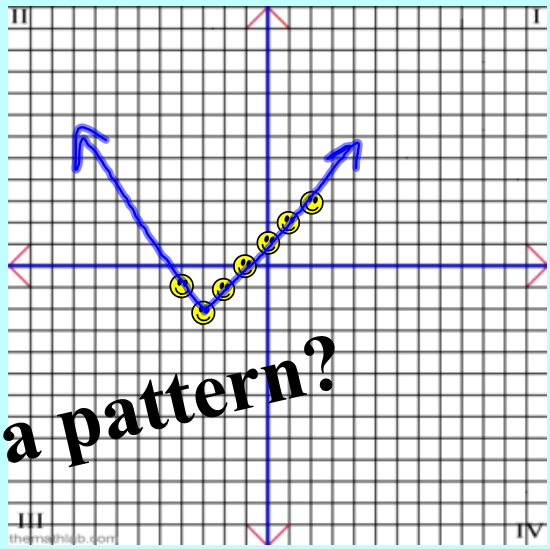
Vertex: (1,4)
Dir: Up



$$y = |x + 3| - 2$$

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

Vertex: (-3,-2)
Dir: Up



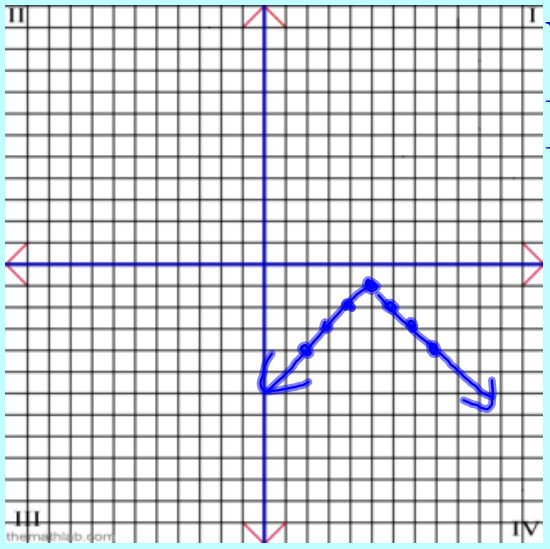
Can you see a pattern?

$$y = -|x - 5| - 1$$

x	y
-2	
-1	
0	
1	
2	

Any predictions?

over	down
1	1
2	2
3	3



Vertex: (5, -1)

Dir: down

Absolute Value Form

$$y = a|x + h| + k$$

Vertex: $(-h, k)$

Stretch Factor: a

What is the stretch factor???

- The stretch factor tells you whether the graph opens up or down. It also tells you how much to stretch the graph by.

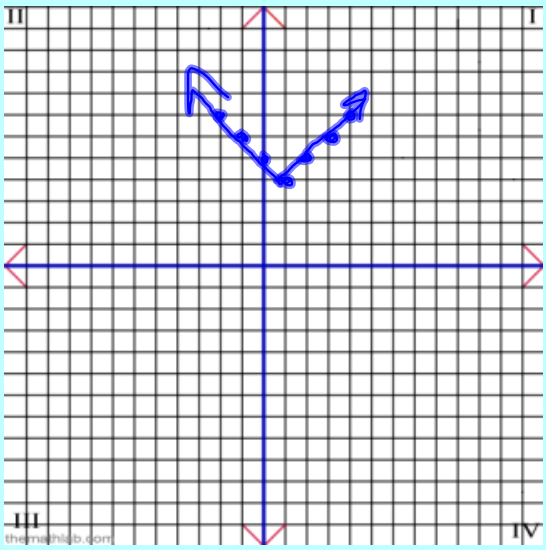
a) $y = |x - 1| + 4$

b) $y = |x + 3| - 2$

Can you graph these without a table of values?

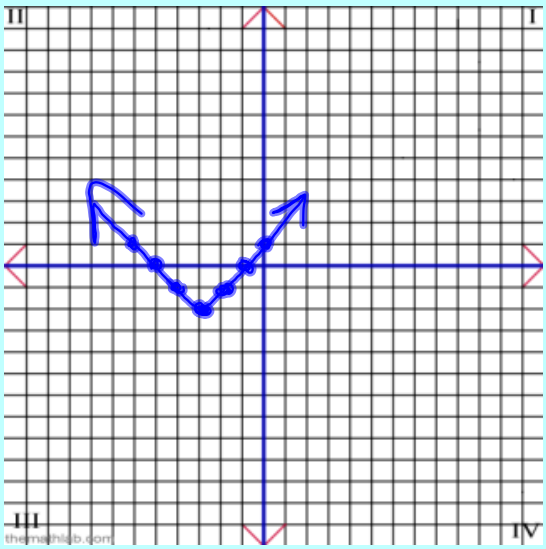
Vertex : (1, 4)

Dir: up



Vertex: (-3, -2)

Dir: up



State the **vertex** of each of the following absolute value functions, and if it will **open up or down**.

1. $y = |x - 5| + 8$
2. $y = -|x + 6| - 7$
3. $y + 4 = |x - 9| + 8$ -4

$y = |x - 9| + 4$