Graphing Absolute Value Equations

Horizontal and Vertical Shifts

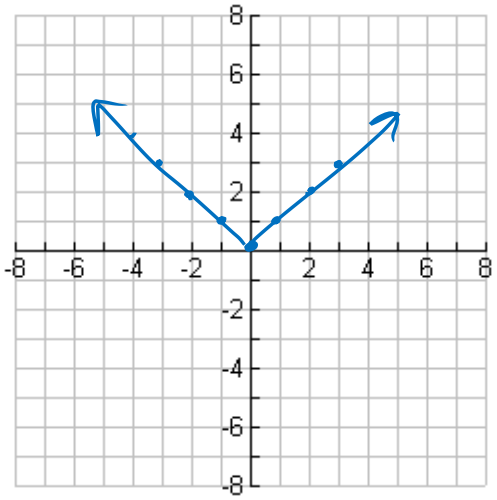
Let's Review! Absolute Value is the distance from zero, so the output is always positive.

For #1-4, evaluate the absolute value expressions.

1. $|-2-3|$ → $|-5|$ → 5
2. $|-4|+1$ → $4+1$ → 5
3. $|4-10|$ → $|-6|$ → 6
4. $2-|-10|$ → $2-10$ → -8

Let's *explore* the absolute value "parent" function: $y=|x|$

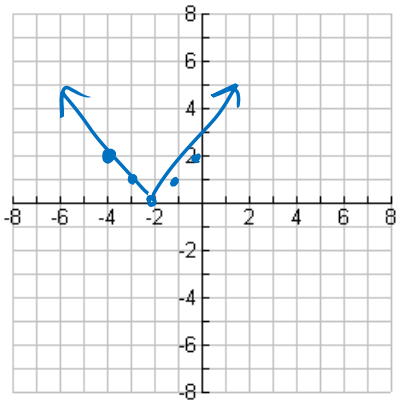
x	y
-2	2
-1	1
0	0
1	1
2	2



Let's try graphing absolute value equations!

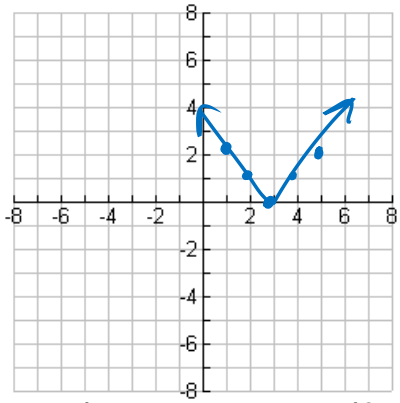
1. $y=|x+2|$

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



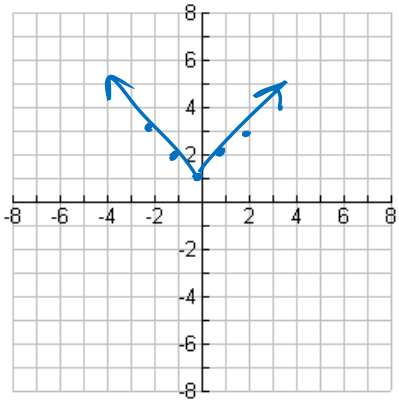
2. $y=|x-3|$

x	y
1	2
2	1
3	0
4	1
5	2



3. $y=|x|+1$

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



*Compare and contrast the three graphs with the parent function. What do you notice?

Can you *predict* what the following graphs will look like?

4. 4. $y = |x - 5|$ 5. $y = |x| - 2$ 6. $y = |x + 3|$

→5 ↓2 ←3

Big Idea: Horizontal/Vertical Shifts

The absolute value graph shifts __Left__ or __Right__ when you add or subtract **INSIDE** the absolute value bars.

The absolute value graph shifts __UP__ or __Down__ when you add or subtract **OUTSIDE** the absolute value bars.

Let's Practice! Given the absolute value equation, determine where the parent function shifts (up, down, left or right).

1. $y = | x - 3|$

Right 3

2. $y = | x | - 5$

Down 5

3. $y = | x + 6 |$

Left 6

4. $y = |x| + 7$

up 7

5. $y = | 4 + x |$

Left 4

6. $y = 2 + |x|$

up 2

WOOhOOO!! Give your partner a high five!!!