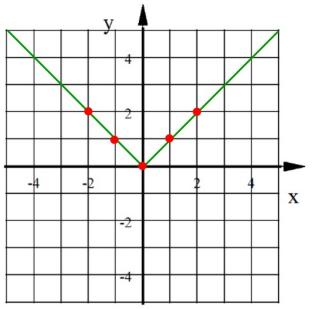
Graphing Absolute Value Functions with a Ti-84graphing calculator.

To graph Absolute Value equations on the Ti-84 you press Y= then perss MATH, arrow to the right so you are under NUM. Choose Option 1: abs(

Enter the equation Y_1 = abs(X) then you can graph it.

The Parent Function y = |x|

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



What is the vertex of the Parent Function?

(0,0)

What is the slope of the sides of the Parent Function?

Right Side: Slope = 1
Left Side: Slope = -1

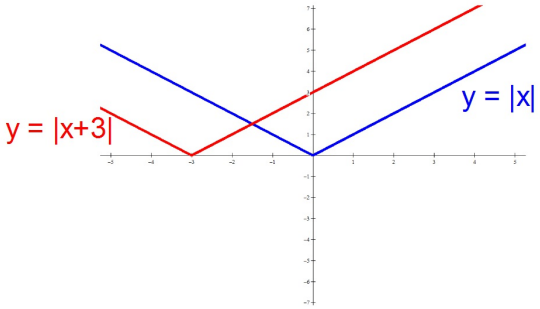
Translations of $y = |x|$ and $y = -|x|$

1. Graph $Y_2 = |x + 3|$ How has this graph moved compared to the parent function?

3 units left

What are the coordinates of the vertex?

(-3, 0)

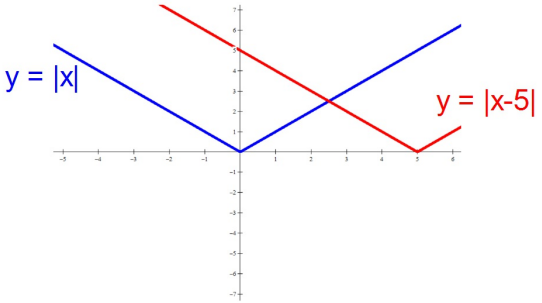


2. Graph $Y_2 = |x - 5|$ How has this graph moved compared to the parent function?

5 units right

What are the coordinates of the vertex?

(5,0)

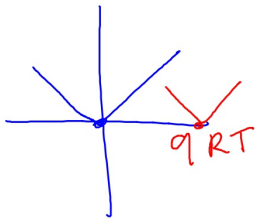


3. a) What equation would move the graph of $y = |x|$ 7 units to the left?

$y = |x + 7|$

b) What equation would be a translation of $y = |x|$ so that the vertex is $(9, 0)$?

$y = |x - 9|$

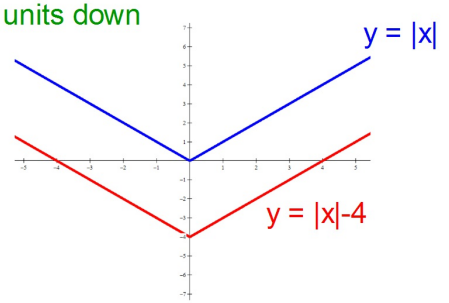


4. Graph $Y_2 = |x| - 4$ How has this graph moved compared to the parent function?

4 units down

What are the coordinates of the vertex?

(0, -4)

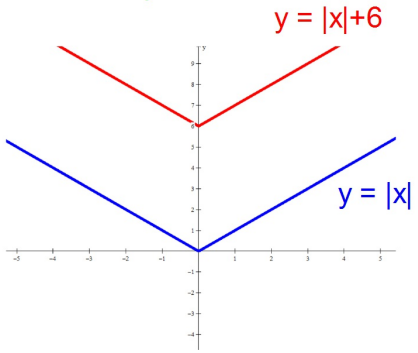


5. $Y = |x| + 6$ How has this graph moved compared to the parent function?

6 units up

What are the coordinates of the vertex?

(0,6)



6. a) What equation would move the graph of $y = |x|$ 2 units up?

$y = |x| + 2$

b) What equation would be a translation of $y = |x|$ so that the vertex is $(0, -9)$?

$y = |x| - 9$ down

To summarize Translations:

shift graph RIGHT

$y = |x - h|$

shift graph LEFT

$y = |x + h|$

shift graph UP

$y = |x| + k$

shift graph DOWN

$y = |x| - k$

Use each description to write the equation of the absolute value function

7. The parent function $y = |x|$ is moved 4 units right and 6 units down.

$y = |x-4| - 6$

8. The parent function $y = -|x|$ is moved 8 units up and 10 units left.

$y = -|x+10| + 8$

9. The parent function $y = -|x|$ and the vertex is $(-7, -5)$

$y = -|x+7| - 5$

7 Left 5 down

10. Describe the translations of the parent function $y = |x|$ that each equation represents and state the coordinates of the vertex.

a. $y = |x - 8| + 7$

Description: 8 RIGHT 7 up

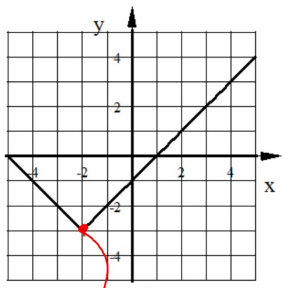
Vertex: (8, 7)

b. $y = |x + 10| - 9$

Description: 10 Left 9 down

Vertex: (-10, -9)

11. The graph below is a translation of $y = |x|$. Write the equation of this function.

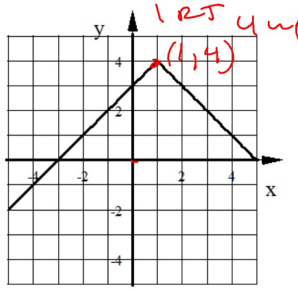


(-2, -3)

2 Left & 3 down

$y = |x+2| - 3$

12. The graph below is a translation of $y = -|x|$
Write the equation of this function.



1 RT 4 up

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

Streches and Shrinks

$y = a|x|$ This equation represents either a strecth (taller) or a shrink (shorter) V-shape.

1. Graph $Y_2 = 7|x|$ How does this graph compare to the parent function $y = |x|$?

7 times Taller

2. Graph $Y_2 = \frac{1}{2}|x|$ How does this graph compare to the parent function $y = |x|$?

Shorter ⇒ half as tall

3. Write the equation of an absolute value function that is one-fourth as tall as $y = |x|$

$y = \frac{1}{4}|x|$

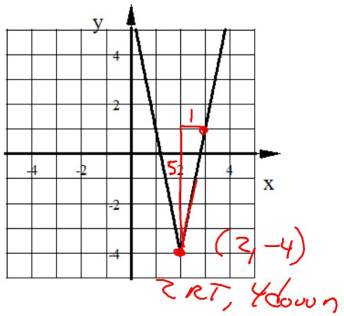
4. Write the equation of an absolute value function that is 3 times taller as $y = |x|$ but opens down.

$y = -3|x|$

$y = a|x|$ a also represents the slope of the sides of the absolute value graph.

5. Write the equation of each absolute value function shown below:

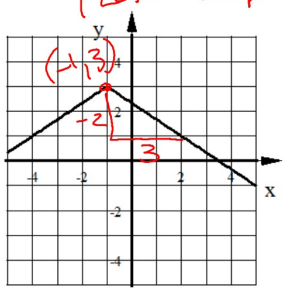
a) EQ:



$y = 5|x-2| - 4$

b) EQ:

1 left 3 up

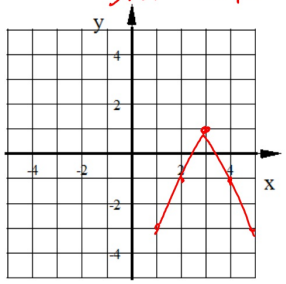


$y = -\frac{2}{3}|x + 1| + 3$

6. Graph each absolute value function.

a) $y = -2|x - 3| + 1$

3 RT 1 up



Vertex (3, 1)

opens down

slope = $\frac{2}{1}$