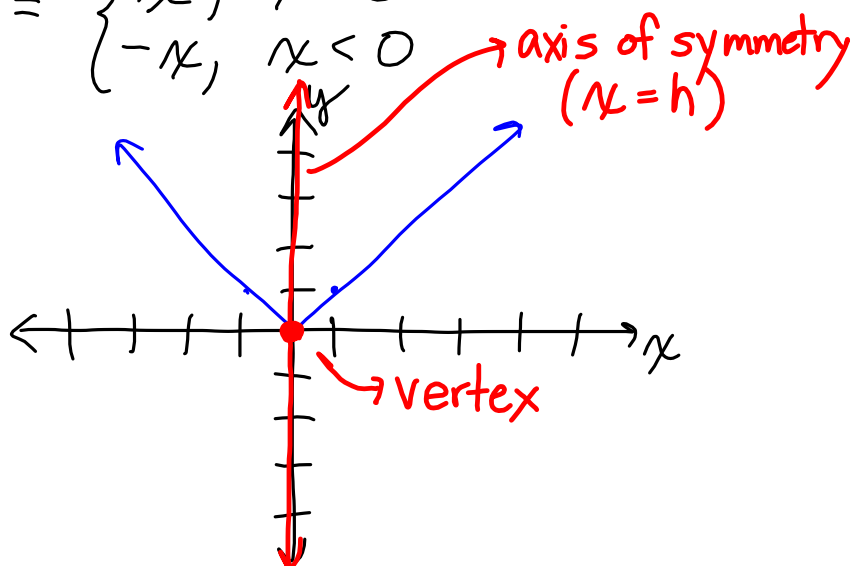


Sec. 2.7 Absolute Value Functions and Graphs

$$f(x) = |x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

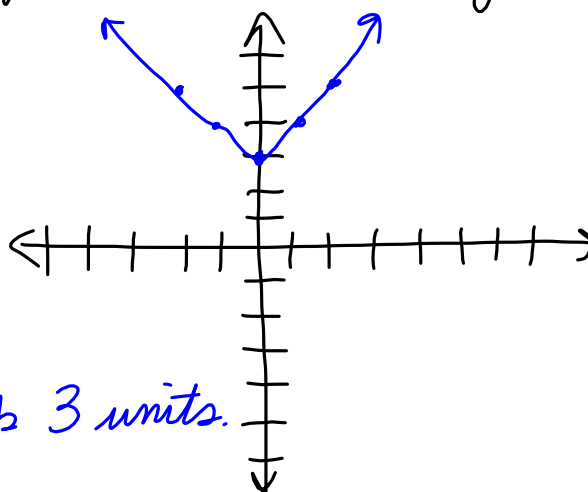
x	y
-2	2
-1	1
0	0
1	1
2	2



Problem 1:

What is the graph of the absolute value function $y = |x| + 3$? How is this graph different from the parent function $y = |x|$?

x	y	
-2	5	$ -2 + 3$
-1	4	$ -1 + 3$
0	3	$ 0 + 3$
1	4	$ 1 + 3$
2	5	$ 2 + 3$



It is translated up 3 units.

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

Problem 2:

Graph $y = |x + 3| - 1$

$$x + 3$$

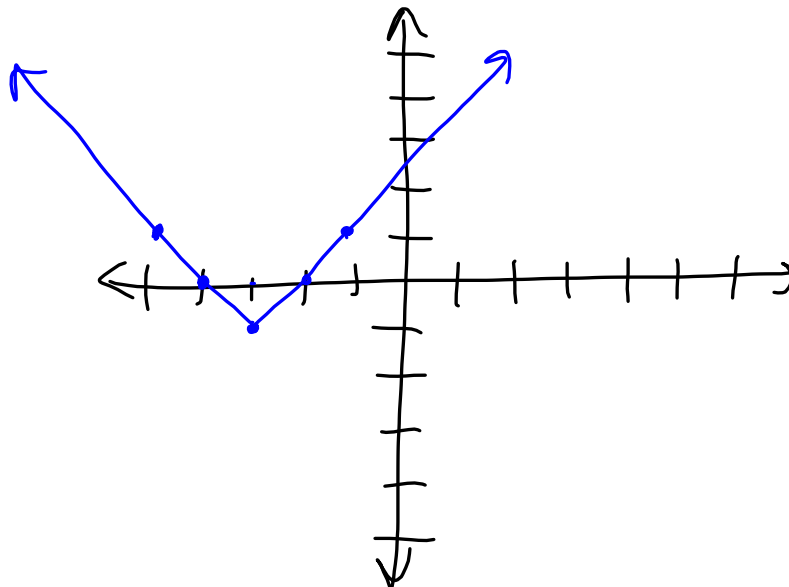
$$x - (-3)$$

$$v: (h, k)$$

$$v: (-3, -1)$$

$$m_R: 1$$

$$m_L: -1$$



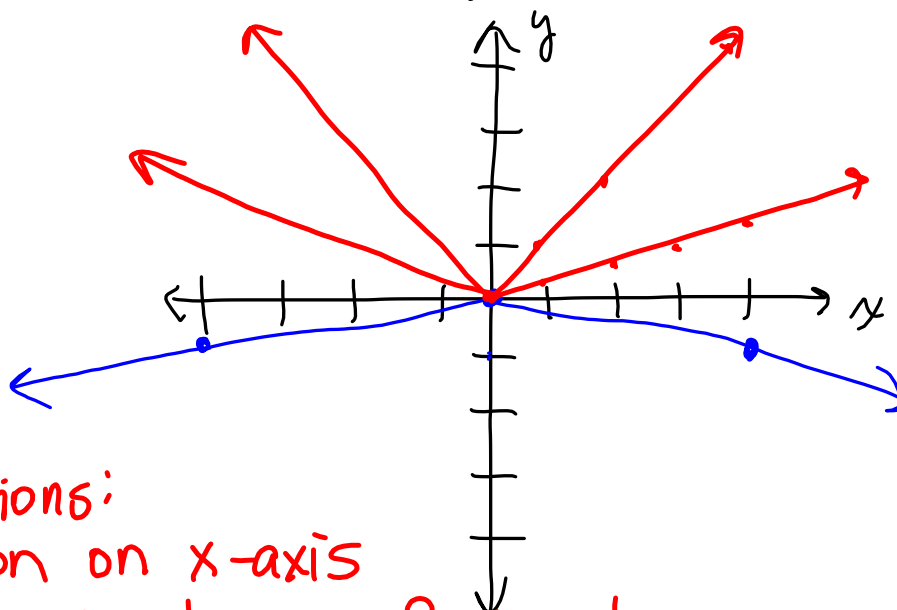
Problem 3:

Graph $y = -\frac{1}{4}|x|$. What are the transformations of the parent function?

$$v: (0, 0)$$

$$m_R: -\frac{1}{4}$$

$$m_L: \frac{1}{4}$$



transformations:

reflection on x-axis

v. compression by the factor $\frac{1}{4}$

Problem 4: $y = a|x-h|+k$

Compare $y = -2|x+2|+3$ with the parent function. Without graphing, what are the vertex, axis of symmetry, and transformations of the parent function?

$$v: (h, k) \rightarrow (-2, 3)$$

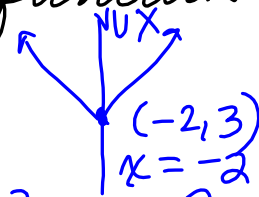
axis of symmetry: $x = h \rightarrow x = -2$

reflected in x -axis

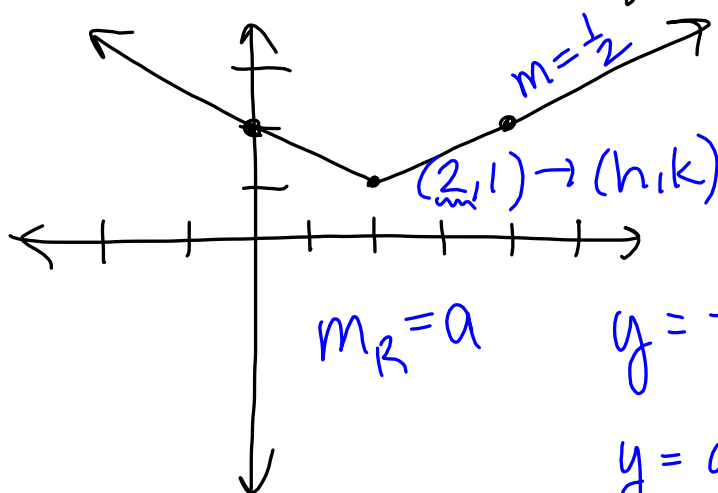
vertical translation 3 units up

horizontal translation 2 units left

vertical stretch by the factor 2.



Problem 5: Write the equation of the absolute value function.



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

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