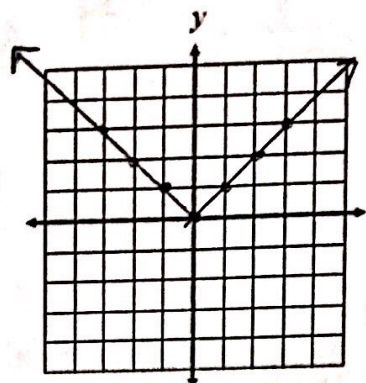
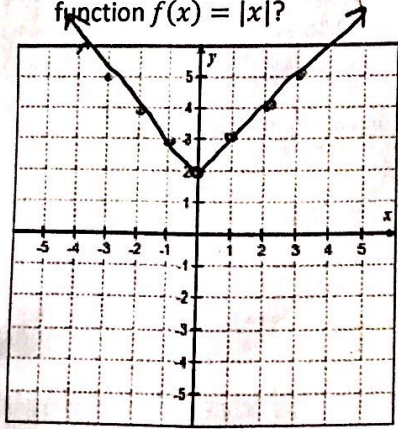


Main Ideas/Questions	Notes/Examples																
Absolute Value Function	function in the form $f(x) = a x-h +k$																
Axis of Symmetry (AOS)	the line that divides a figure into two parts that are mirror image $(x=h)$																
Vertex	a point where the function reaches a max or a min (h,k)																
Parent Function Vertex $(0,0)$ AOS $x=0$	• Complete the table below to graph the function. Give the domain and range. → x-vals $f(x) = x $  <table border="1" data-bbox="494 582 670 896"> <thead> <tr> <th>x</th> <th> x </th> </tr> </thead> <tbody> <tr><td>-3</td><td>3</td></tr> <tr><td>-2</td><td>2</td></tr> <tr><td>-1</td><td>1</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>3</td></tr> </tbody> </table> $D = \mathbb{R}$ (all real numbers) $R = [0, \infty)$ $y \geq 0$	x	x	-3	3	-2	2	-1	1	0	0	1	1	2	2	3	3
x	x																
-3	3																
-2	2																
-1	1																
0	0																
1	1																
2	2																
3	3																

Translating the Parent Function $f(x) = x $	<u>Vertical Translation</u> $ x + k$ up k units $ x - k$ down k units	<u>Horizontal Translation</u> $ x-h $ right h units $ x+h $ left h units
	<u>Vertical Stretch/Compression</u> $a x $ $ a > 1$ stretch $0 < a < 1$ compress	<u>Reflection</u> $- x $ reflect over x-axis $ -x $ reflect over y-axis

Directions: Graph the following functions. Explain how they differ from the parent function.

1. What is the graph of the absolute value function $y = |x| + 2$? How is the graph different from the parent function $f(x) = |x|$?

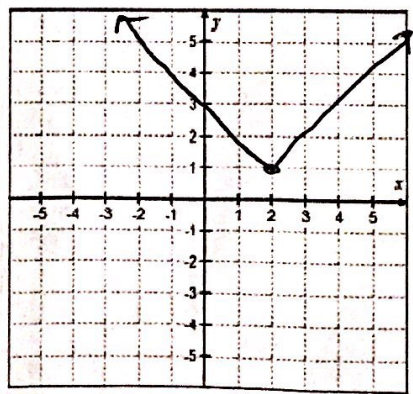


$(0, 2)$
 $a = 1$
 (slope = 1)

 $D: \mathbb{R}$
 $R: [2, \infty)$
 AOS: $x = 0$

translated up 2

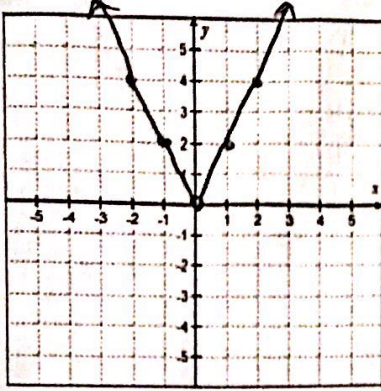
2. What is the graph of the absolute value function $y = |x - 2| + 1$? How is the graph different from the parent function $f(x) = |x|$?



$(2, 1)$
 AOS: $x = 2$
 $D: \mathbb{R}$
 $R: [1, \infty)$
 $a = 1$ ← slope

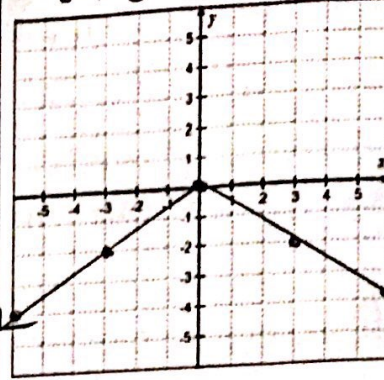
up 1, right 2

3. What is the graph of $y = 2|x|$? How does the graph differ from the parent function?



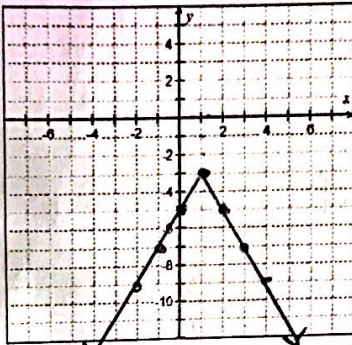
$(0,0)$
 AOS $x=0$
 $D: \mathbb{R}$
 $R: [0, \infty)$
 $a=2$
 Stretched

4. What is the graph of $y = -\frac{2}{3}|x|$? How does the graph differ from the parent function?



$(0,0)$
 AOS $x=0$
 $D: \mathbb{R}$
 $R: [0, \infty)$
 $a = -\frac{2}{3}$
 compressed
 reflect x -axis

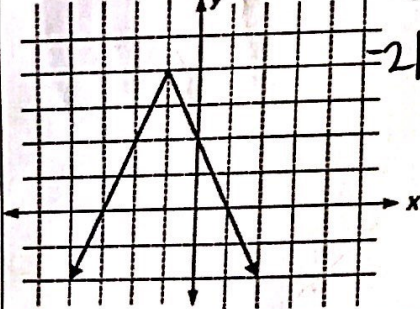
5. What are the vertex and axis of symmetry of $y = -2|x - 1| - 3$? Graph the function below. How is this different from the parent function?



$(1, -3)$
 AOS $x=1$
 $D: \mathbb{R}$
 $R: (-\infty, -3]$

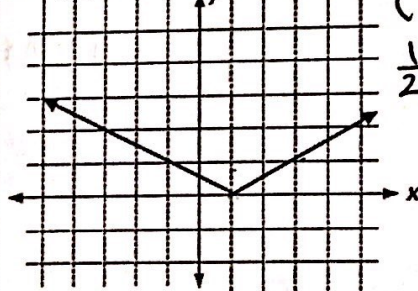
reflect x -axis
 stretched
 right 1
 down 3

6. What is the equation of the absolute value function shown below?



$(-1, 4)$
 $-2|x+1|+4$

7. What is the equation of the absolute value function shown below?



$(1, 0)$
 $\frac{1}{2}|x-1|$

Without graphing, identify the vertex, axis of symmetry, and transformations from the parent function $f(x) = |x|$.

8. $y = |x - 4| + 3$
 $(4, 3)$ AOS $x=4$
 right 4 up 3

9. $y = -\frac{1}{2}|x + 1|$
 $(-1, 0)$ AOS $x=-1$
 reflect x -axis, compress, left 1

10. $y = |-x + 9| + 9$
 reflect y -axis
 up 9
 $(0, 9)$
 AOS $x=0$

11. $y = 2|x + 2| - 3$
 $(-2, -3)$ AOS $x=-2$
 stretch
 left 2 down 3