

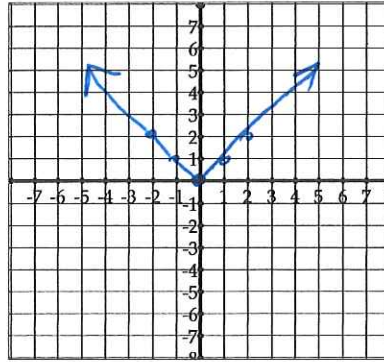
Notes 2-7A Absolute Value Functions and Transformations
Algebra II

Name _____

Period _____

Parent Function: $f(x) = |x|$

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



Vertex: $(0, 0)$

Here's what we learned from the Desmos Lab:

If we want to...	the equation should be...	the function notation should be...
slide the graph vertically k spaces	$y = x + k$	$f(x) = x + k$
stretch/compress the graph vertically, scale factor a	$y = a x $	$f(x) = a x $
slide the graph horizontally h spaces	$y = x - h $	$f(x) = x - h $
flip the graph vertically	$y = - x $	$f(x) = - x $

Vertex form: $f(x) = a|x - h| + k$

The vertex is located at (h, k)

Examples: List the transformations, label the vertex and graph each of the following:

$f(x) = |x + 3| + 2$ Trans: 3 L & 2 U

vertex: $(-3, 2)$

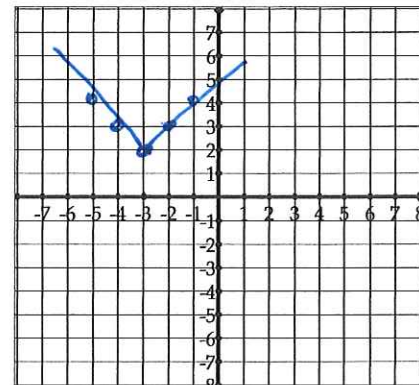
parent

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

transformation

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

← vertex



$f(x) = |x - 4| - 3$ Trans: 4R & 3↓

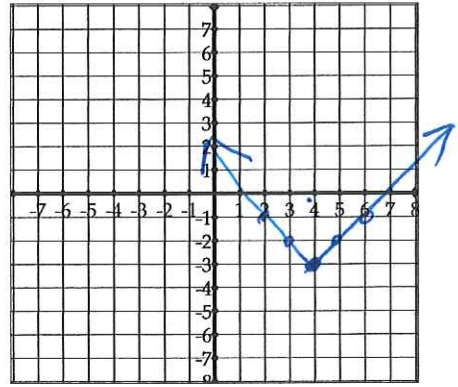
Parent

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

vertex: (4, -3)
transformation

x+4	y-3
2	-1
3	-2
<u>4</u>	<u>-3</u>
5	-2
6	-1

← vertex



$f(x) = 3|x|$ Trans: vertical stretch - factor of 3

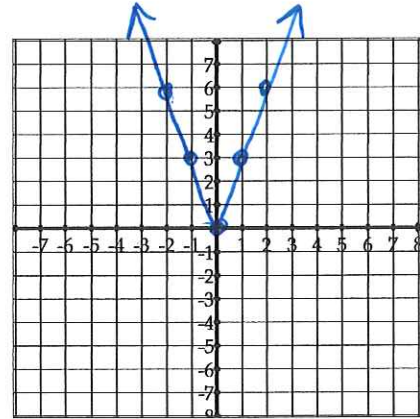
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x	y
-2	2
-1	1
0	0
1	1
2	2

vertex: (0, 0)
transformation

x	3y
-2	6
-1	3
<u>0</u>	<u>0</u>
1	3
2	6

← vertex



$f(x) = -|x - 2| + 3$ Trans: 2R & 3↑

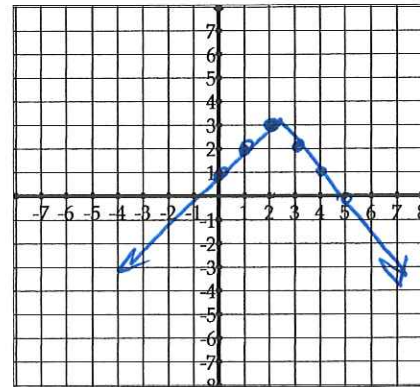
Parent

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

vertex: (2, 3)
trans. vertical "flip"

x+2	-y+3
0	1
1	2
<u>2</u>	<u>3</u>
3	2
4	1

← vertex



$f(x) = \frac{1}{2}|x + 2|$ Trans: 2 Left / vert. comp 1/2

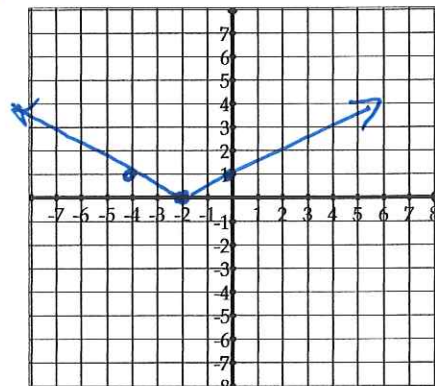
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x	y
-2	2
-1	1
0	0
1	1
2	2

Vertex: (-2, 0)
trans

x-2	1/2y
-4	1
-3	1/2
<u>-2</u>	<u>0</u>
-1	1/2
0	1

← vertex



* tip * vertical stretch / comp. factor = "slope" from vertex → 1st point left & right