

Find and sit in assigned seat -
there were a few small
changes from yesterday

Turn in disclosures if signed!

- * Pass back tasks from yesterday
 - * Get out math notebooks

Essential Question

How do a , h , and k affect the graph of the absolute value function $g(x) = a|x - h| + k$?

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

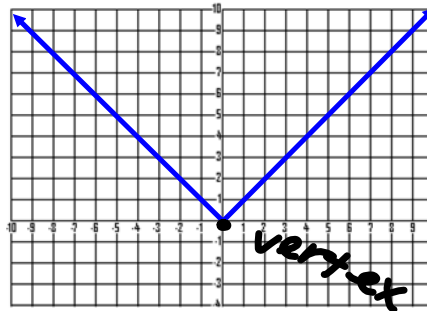
Task 1.1 Absolute Value Functions Translations

Name _____ Hr _____

Part 1: Absolute Value Functions

1. What is the definition of "the absolute value of x ?" distance of x from 0
2. Complete the following T-Table for the function $f(x) = |x|$. Then graph it on the coordinate plane.

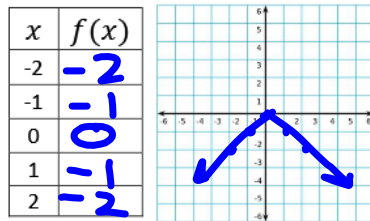
x	$f(x)$
-2	2
-1	1
0	0
1	1
2	2



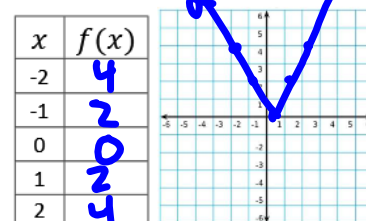
3. What type of shape does an absolute value graph make? V shape
4. Do you think all absolute value graphs make this same shape? Why/why not? Yes!

Absolute value functions can be transformed. Complete each table then plot the points to see each transformation. When you describe a transformation, describe how it has changed from the parent function $f(x) = |x|$ above.

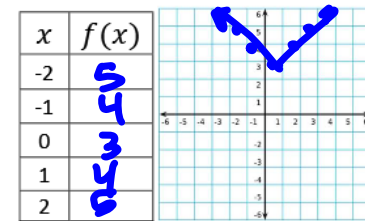
5. $f(x) = -|x|$



6. $f(x) = 2|x|$

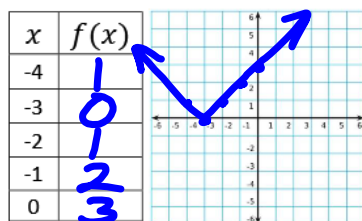


7. $f(x) = |x| + 3$

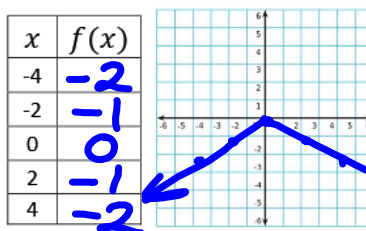


Transformation: reflect over x-axis Transformation: stretch Transformation: Up 3

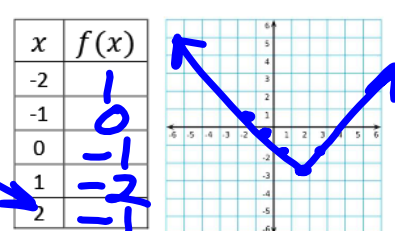
8. $f(x) = |x + 3|$



9. $f(x) = -\frac{1}{2}|x|$



10. $f(x) = |x - 1| - 2$



Transformation: Left 3 Transformation: reflects compress Transformation: down 2 right

Essential Question

How do a , h , and k affect the graph of the absolute value function $g(x) = a|x - h| + k$?

a : negative: reflect over x-axis
 $a > 1$: stretch
 $0 < a < 1$: compress (shrink)

h : left or right in opposite direction
 $+h$, left
 $-h$, right

k : up or down

 Desmos Visual

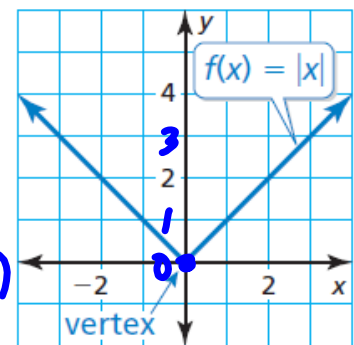
Core Concept

Absolute Value Function

An **absolute value function** is a function that contains an absolute value expression. The parent absolute value function is $f(x) = |x|$. The graph of $f(x) = |x|$ is V-shaped and symmetric about the y-axis. The **vertex** is the point where the graph changes direction. The vertex of the graph of $f(x) = |x|$ is $(0, 0)$.

The domain of $f(x) = |x|$ is all real numbers. $(-\infty, \infty)$

The range is $y \geq 0$. $[0, \infty)$



Domain and Range

Domain is all the x values

- The x values go from left to right
- So, domain is how far left and right it goes *

Range is all the y values

- The y values go from low to high
- So, range is how far down to up it goes *

Describe the transformations from the graph of $f(x) = |x|$ to the graphs of g .

$$\rightarrow g(x) = |x| - 7$$

↓ 7

$$g(x) = -|x+3| + 1$$

↗ reflect
left 3
up 1

$$\rightarrow g(x) = 2|x - 8|$$

stretch → 8

$$\rightarrow g(x) = -|x| + 6$$

↗ reflect
up 6

Describe the transformations from the graph of $f(x) = |x|$ to the graph of g .

$$\rightarrow g(x) = \frac{1}{3}|x|$$

Compress

$$\rightarrow g(x) = |x - 1| - 2$$

right 1
down 2

$$\rightarrow g(x) = -4|x + 4|$$

Left 4
Stretch
reflect

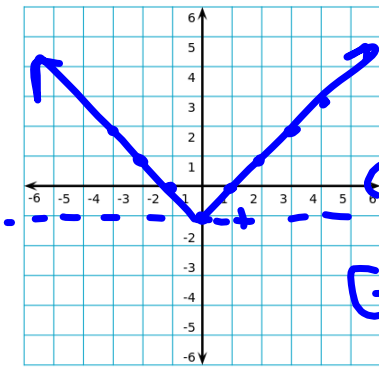
$$\rightarrow g(x) = -\frac{2}{5}|x| + 7$$

up 7
Compress
reflect

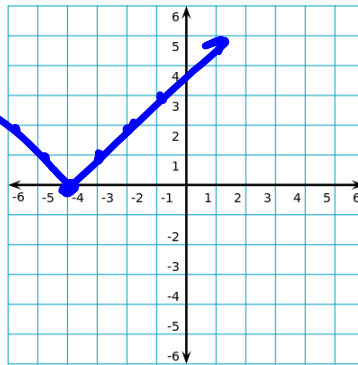
Graph each function. Compare each graph to the graph of $f(x) = |x|$. Describe the domain and range.

1. $h(x) = |x| - 1$

2. $n(x) = |x + 4|$



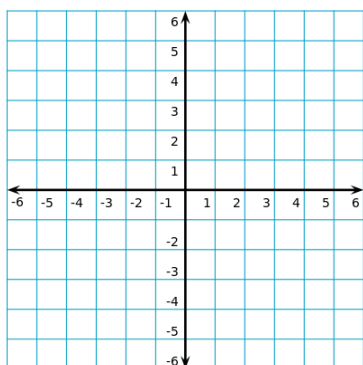
D: $(-\infty, \infty)$
 R: $[-1, \infty)$



D: $(-\infty, \infty)$
 R: $y \geq 0$
 $[0, \infty)$

Graph each function. Compare each graph to the graph of $f(x) = |x|$. Describe the domain and range.

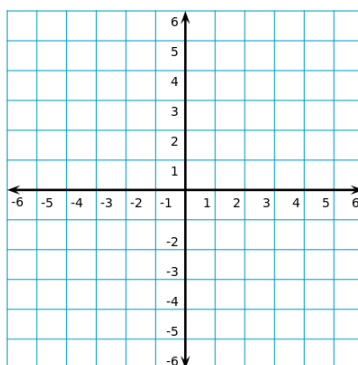
3. $t(x) = -3|x|$



D:

R:

4. $v(x) = \frac{1}{4}|x|$

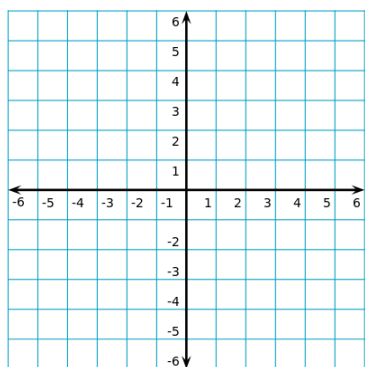


D:

R:

Graph each function. Compare each graph to the graph of $f(x) = |x|$. Describe the domain and range.

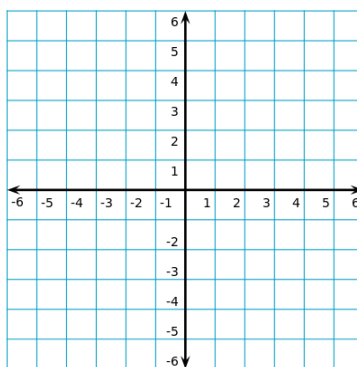
5. $f(x) = |x + 2| - 3$



D:

R:

6. $g(x) = -2|x - 1| + 3$



D:

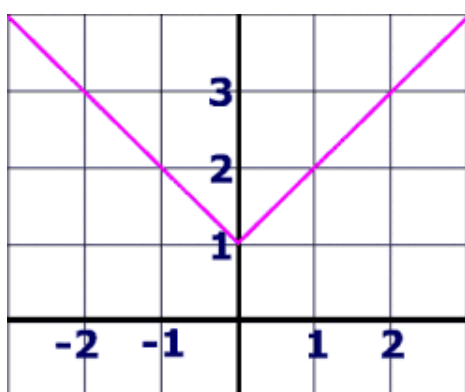
R:

 **Core Concept****Vertex Form of an Absolute Value Function**

An absolute value function written in the form $g(x) = a|x - h| + k$, where $a \neq 0$, is in **vertex form**. The vertex of the graph of g is (h, k) .

Any absolute value function can be written in vertex form, and its graph is symmetric about the line $x = h$.

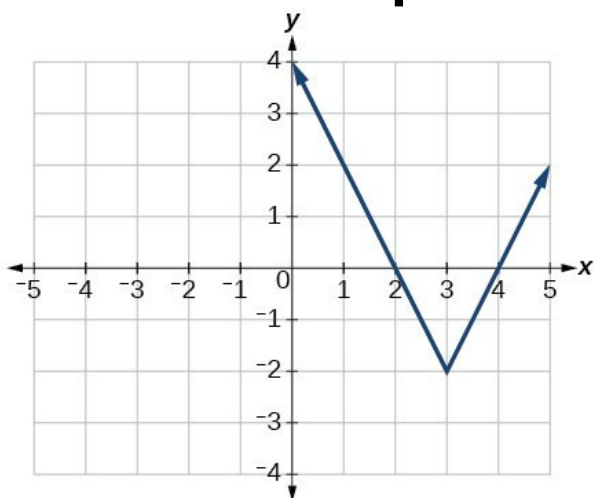
Write the equation of the graph shown



D:

R:

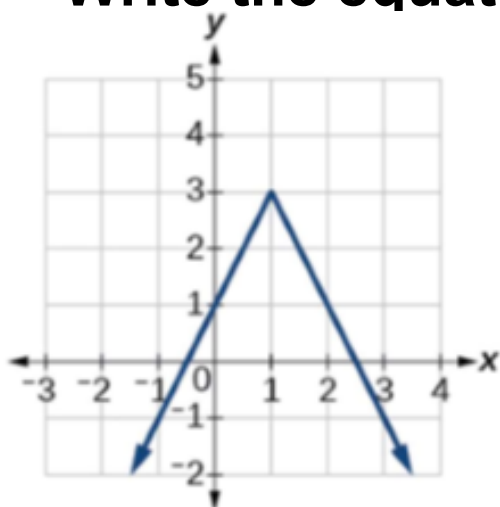
Write the equation of the graph shown



D:

R:

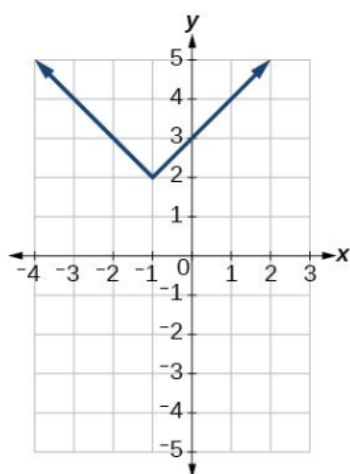
Write the equation of the graph shown



D:

R:

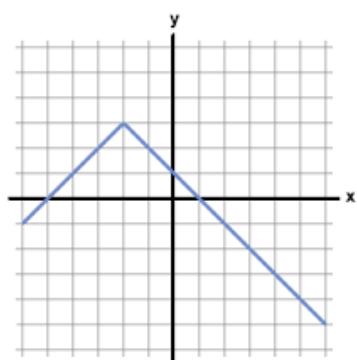
Write the equation of the graph shown



D:

R:

Write the equation of the graph shown



D:

R:

Show how to graph on calculator...

Hw 1.1 #s 1-3, 5, 7, 9, 23-26,
35-37, 42, 45, 46, 64, 67

due Monday