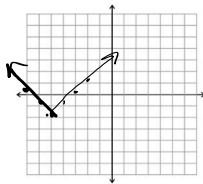


## Absolute Value Day 2

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



## Vocabulary Review

Domain: *x-values*

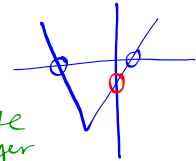
Range: *y-values*

Increasing: *Slope is positive getting bigger*

Decreasing: *Slope is negative*

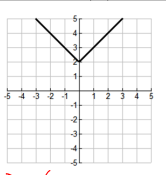
x-intercept: *Where the graph crosses the x-axis*  $y=0$

y-intercept: *Where the graph crosses the y-axis*  $x=0$



Find domain and range

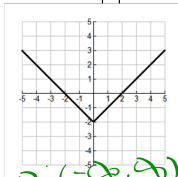
$$f(x) = |x| + 2$$



*D:  $(-\infty, \infty)$   
 $\{x | x \in \mathbb{R}\}$   
 R:  $[2, \infty)$   
 $\{y | y \geq 2\}$*

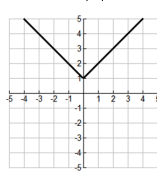
make a conjecture about what effects the range

$$f(x) = |x| - 2$$



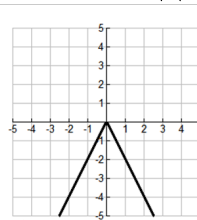
*D:  $(-\infty, \infty)$   
 R:  $[-2, \infty)$*

$$f(x) = |x| + 1$$



Find domain and range

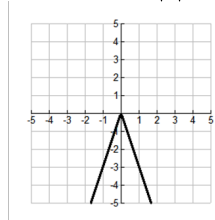
$$f(x) = -2|x|$$



*D:  $(-\infty, \infty)$   
 R:  $(-\infty, 0]$*

make a conjecture about what effects the range

$$f(x) = -3|x|$$



What is always the domain of an absolute value function?

$$(-\infty, \infty)$$

What kind of transformations change the range?

Reflections, Up & down

$$f(x) = |x-3| + 3$$

$$D: (-\infty, \infty)$$

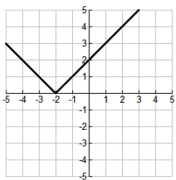
$$R: [3, \infty)$$

Find where we are increasing and decreasing

$$f(x) = |x+2|$$

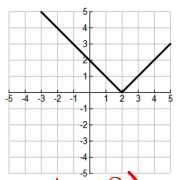
$$f(x) = |x-2|$$

$$f(x) = |x+1|$$



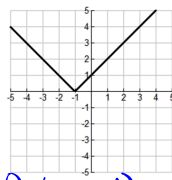
$$D: (-\infty, -2)$$

$$I: (-2, \infty)$$



$$D: (-\infty, 2)$$

$$I: (2, \infty)$$



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

$$I: (-1, \infty)$$

make a conjecture about what effects increasing/decreasing

What kind of transformations effect where we are decreasing and increasing?

flips & shifts left & right



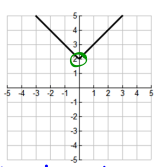
$$f(x) = |x-3| + 2$$

$$D: (-\infty, 3)$$

$$I: (3, \infty)$$

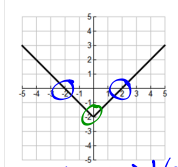
Find x & y intercepts

$$f(x) = |x| + 2$$



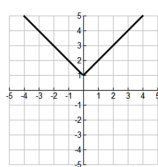
x-int: none  
y-int: (0, 2)

$$f(x) = |x| - 2$$



x-int: (-2, 0) & (2, 0)  
y-int: (0, -2)

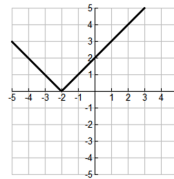
$$f(x) = |x| + 1$$



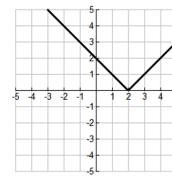
make a conjecture about what effects the x-intercepts

Find x & y intercepts

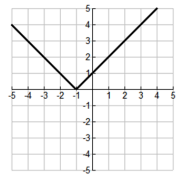
$$f(x) = |x + 2|$$



$$f(x) = |x - 2|$$



$$f(x) = |x + 1|$$



make a conjecture about what effects the y-intercepts

How many y-intercepts can we have?

How many x-intercepts can we have?

Solving an Absolute Value

$$|x| = 3$$

What are the possible values x can be?

3, -3

## Solve the Absolute Values

$$|x-2|=4$$

$$\begin{array}{l} x-2=4 \\ +2 \quad +2 \\ x=6 \end{array} \quad \begin{array}{l} x-2=-4 \\ +2 \quad +2 \\ x=-2 \end{array}$$

$$|x|+3=7$$

$$\begin{array}{l} -3 \quad -3 \\ |x|=4 \\ x=4 \quad x=-4 \end{array}$$

$$|x-4|+3=12$$

$$2|x+5|-3=15$$

## Finding $x$ & $y$ intercepts algebraically.

$$f(x)=|x+5|$$

$$0=|x+5|$$

$$x=-5$$

$$y=|0+5|$$

$$y=5$$

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

$$0=|x-3|+2$$

$$-2=|x-3|$$

$$-2=x-3 \quad 2=x-3$$

$$1=x \quad 5=x$$

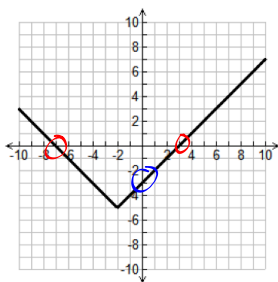
$$(1,0) \text{ and } (5,0)$$

$$y=|0-3|+2$$

$$y=3+2$$

$$y=5$$

$$(0,5)$$



Increasing:  $(-2, \infty)$

Decreasing:  $(-\infty, -2)$

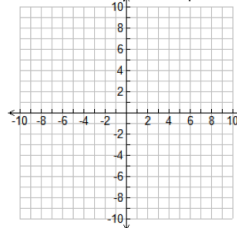
x-intercepts:  $(-7, 0)$  and  $(3, 0)$

y-intercept:  $(0, -3)$

Equation:  $f(x)=|x+2|-5$

Domain:  $(-\infty, \infty)$  Range:  $[-5, \infty)$

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



Increasing: \_\_\_\_\_

Decreasing: \_\_\_\_\_

x-intercepts: \_\_\_\_\_

y-intercept: \_\_\_\_\_

Equation: \_\_\_\_\_

Domain: \_\_\_\_\_ Range: \_\_\_\_\_