

Learning Goal Check!



Complete the following questions.

When you have finished, submit them through the **Learning Goal Check** Google Form posted to the classroom or website by taking a picture and attaching it.

Graph each of the following and state the domain and range.

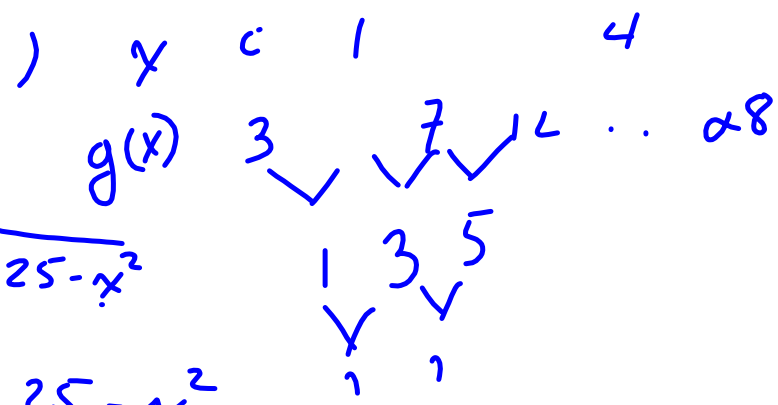
a) $y = -2(x + 3)^2$

b) $y = -\sqrt{x-1} - 4$

11

10

14 $y = \sqrt{25 - x^2}$

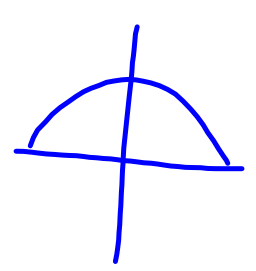


$y = \sqrt{25 - x^2}$

$y^2 = 25 - x^2$

$y^2 + x^2 = 25$

D: $[-5, 5]$
R: $[0, 5]$

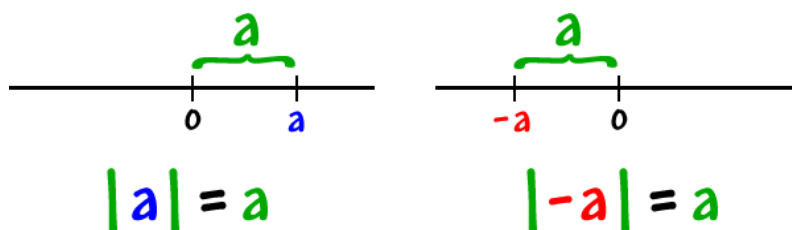


1.02 - Absolute Values and Interval Notation



Learning Goals:

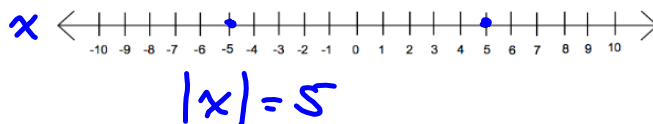
- I can graph transformations of the absolute value function, and state several properties.
- I can express a solution for an equation and inequality in set notation, absolute value notation and interval notation.
- I can graph all solutions for equations and inequalities on the number line.



RECALL: The absolute value of anything is positive!. It is a measurement of the distance from the axis' origin with no indication of direction.

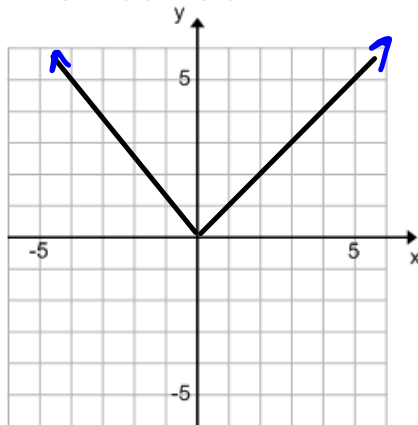
The notation used is $|x|$.

This axis is traditionally referred as the **number line**.



Since each element x on an axis has one and only one absolute value, the absolute value of x can be described as a function.

Graph $f(x) = |x|$



Important Properties:

- symmetric about the y-axis

- $D : \{x \in \mathbb{R}\}$

$R : \{y \in \mathbb{R} \mid y \geq 0\}$

- x-intercept = 0

y-intercept = 0

- End Behaviours:

$x \rightarrow +\infty, y \rightarrow +\infty$

$x \rightarrow -\infty, y \rightarrow +\infty$

- comprised of 2 linear functions

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

Interval Notation: Interval notation is a more compact way to write a range using open brackets ((or)) and closed brackets ([or]) to create a set of numbers. These number inside of the brackets denote the endpoints of the interval and whether the value is included (closed bracket) or not (open bracket)

i.e. $[4, 10)$ means "beginning at 4 and up to but not including 10"

$$x \in \mathbb{R} \quad (-\infty, \infty)$$

Note: If the part of the interval is infinite, the endpoint is infinity (∞) and it is open bracket.

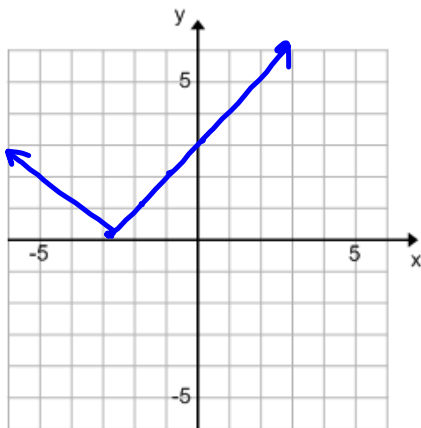
Absolute Value Notation:

Absolute value notation is a way to condense an interval given in set notation by using the absolute value.

i.e. $\{x \in \mathbb{R} \mid -2 \leq x \leq 2\}$ becomes $\{x \in \mathbb{R} \mid |x| \leq 2\}$

Graph the following function:

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



State the domain and range using interval notation

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

$$R: [0, \infty)$$

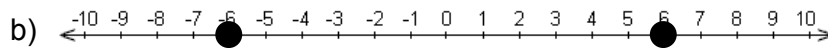
$$\{x \in \mathbb{R}\}$$

$$\{y \in \mathbb{R} \mid y \geq 0\}$$

Express the following in absolute value notation

a) $\{x \in \mathbb{R} \mid x \leq -5 \text{ or } x \geq 5\}$

$$|x| \geq 5$$



$$|x| = 6$$

And finally... what is $\sqrt{x^2}$ simplified? (not on the printout)

$$\begin{aligned} f(x) &= \sqrt{x^2} \\ &= |x| \end{aligned}$$

Practice:

pg. 16 #2 - 5, 7.

**Final Answer Corrections:*

4c: A horizontal number line with arrows at both ends, labeled from -6 to 6. There are tick marks for every integer, but no shading or markings are present on the line.

i.e. no solution (so no "shading")

4d: A horizontal number line with arrows at both ends, labeled from -6 to 6. The entire line is shaded in a solid green color.

i.e. entire number line (entire line is "shaded")

Now do these two quick quizzes:

<http://courseware.cemc.uwaterloo.ca/8/assignments/75/3><http://courseware.cemc.uwaterloo.ca/8/assignments/75/4>