

## 1.2 Absolute Value Notation and Interval Notation

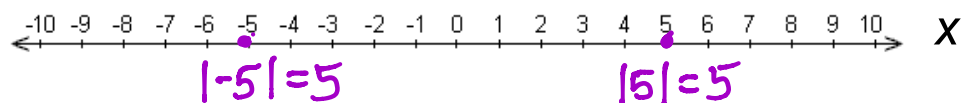
### Math Learning Target:



"I can graph transformations of the absolute value function, and state all properties. I can express a solution in set notation, absolute value notation and interval notation. I can graph all solutions on the real number line. I can apply what I have learned in familiar and unfamiliar settings."

#### absolute value

The **absolute value** of a number is its distance from the origin if the number is placed on the real number line.



Let  $x$  represent an unknown real number. Its absolute value is represented by  $|x|$ .

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.

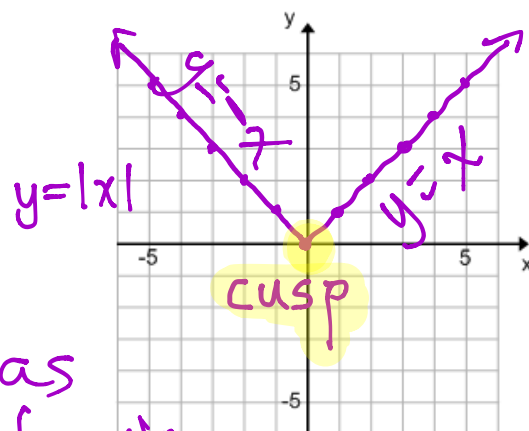
Graph  $f(x) = |x|$

Important Properties:

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

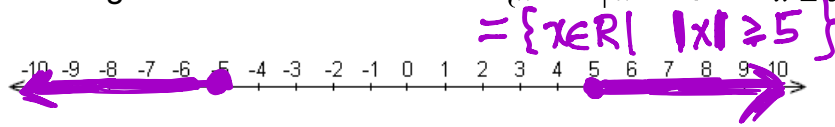
Range:  $\{y \in \mathbb{R} \mid y \geq 0\}$

It is a function as each value in its domain corresponds to one unique value in its range.

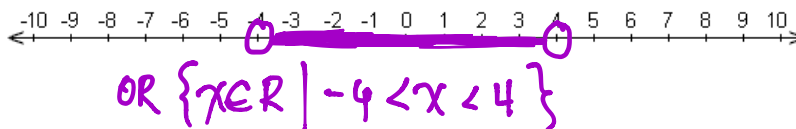


## Examples

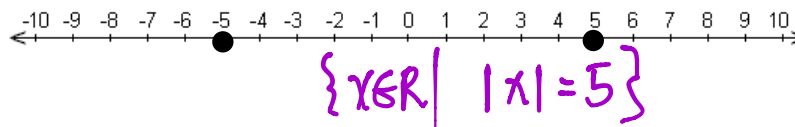
1. Express using absolute value notation:  $\{x \in \mathbb{R} \mid x \leq -5 \text{ or } x \geq 5\}$



2. Graph on the real number line:  $\{x \in \mathbb{R} \mid |x| < 4\}$



3. Express using absolute value notation:



4. Express in interval notation:

a)  $\{x \in \mathbb{R} \mid x > 6\}$   $(6, \infty)$

b)  $\{x \in \mathbb{R} \mid -3 \leq x \leq 5\}$   $[-3, 5]$

c)  $\{x \in \mathbb{R} \mid |x| < 2\}$   $(-2, 2)$

If #4 was difficult, study video lessons 1, 2 and 3:

<http://courseware.cemc.uwaterloo.ca/8/assignments/75/0>



*On any assessment in this course, you must be prepared to present your solution in set notation, interval notation and absolute value notation.*

And finally... what is  $\sqrt{x^2}$  simplified?

$$= |x|$$

## MathSIP!

pg. 16 #2, 3, 4\*, 5, 7 + quizzes below

\*Final Answer Corrections:

4c:  i.e. no solution (so no "shading")

4d:  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>

