

[1-7] Absolute Value Equations and Inequalities

Distance From zero

① $|x| = 5$

$x = 5$ and $x = -5$

$x = \pm 5$

positive, negative 5

② $|\frac{x}{2}| = 5$

$\frac{x}{2} = 5$ and $\frac{x}{2} = -5$

$x = 10$ and $x = -10$

$x = \pm 10$

Isolate the ab. value FIRST

③ $|x + 3| = 1$

$x + 3 = 1$ and $x + 3 = -1$

$x = -2$ and $x = -4$

④ $|x| + 5 = 3$

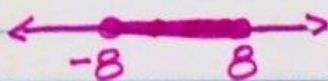
$|x| = -2$

N.S.

Ab. Value can't be negative

⑤ $|x| \leq 8$

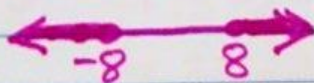
$x \leq 8$ and $x \geq -8$
 $-8 \leq x \leq 8$



Less Than AND

⑥ $|x| \geq 8$

$x \geq 8$ or $x \leq -8$



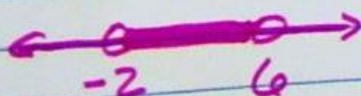
Greater Than OR

3rd copy

⑦ $|3x - 6| < 12$

$3x - 6 < 12$ AND $3x - 6 > -12$
 $3x < 18$ $3x > -6$

$x < 6$ and $x > -2$



1st: Make sure Ab. Value is isolated.

2nd: Decide if AND OR

3rd: Write 2 inequalities
4th: Solve.

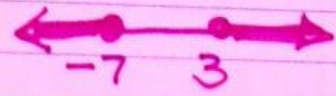
⑧ $|x + 2| \geq 5$

Flip \downarrow *opposite* \swarrow

$x + 2 \geq 5$ OR $x + 2 \leq -5$

$x \geq 3$ $x \leq -7$

$x \geq 3$ or $x \leq -7$



⑨ $|2 - x| - 3 < 1$ \rightarrow Get ab. value isolated.

$|2 - x| < 4$

$2 - x < 4$ AND $2 - x > -4$

$-x < 2$ $-x > -6$

$x > -2$ and $x < 6$

$-2 < x < 6$



Homework $\boxed{\text{p 48 } (\#15-24) \times 3 \leftarrow \text{multiples of 3}}$

$(\#27-34) \text{ all}$