

Definition:

For any real number  $x$ ,

- 1)  $|x| = x$  if  $x$  is nonnegative ( $x \geq 0$ ), and
- 2)  $|x| = -x$  (the opposite of  $x$ ) if  $x$  is negative ( $x < 0$ )

Absolute value equalities and inequalities are compound sentences. They are either conjunctions or disjunctions as indicated below:

$|x| = \text{value}$  is an "**OR**" sentence (disjunction)

$|x| > \text{value}$  is an "**OR**" sentence (disjunction)

$|x| < \text{value}$  is an "**AND**" sentence (conjunction)

**EO**

Equal **Or**

**LA**

Less Than **And**

**GO**

Greater **Or**

Ex 1) Solve and graph:  $|5x - 4| = 11$

⊕ OR  $\square$

$$5x - 4 = 11$$

$+4 \quad +4$

$$- (5x - 4) = 11$$
$$-5x + 4 = 11$$

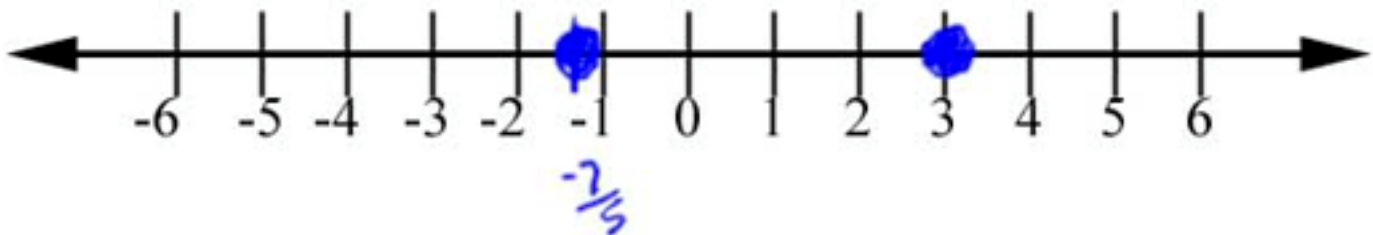
$-4 \quad -4$

$$5x = 15$$

$$-5x = 7$$

$\underline{-5} \quad \underline{-5}$

$x = 3$  OR  $x = -\frac{7}{5}$



Ex 2) Solve and graph:  $|3x - 2| < 4$

(+)

$$3x - 2 < 4$$

$+2 \quad +2$

$$3x < 6$$

$$x < 2$$

AND (-)

$$-(3x - 2) < 4$$

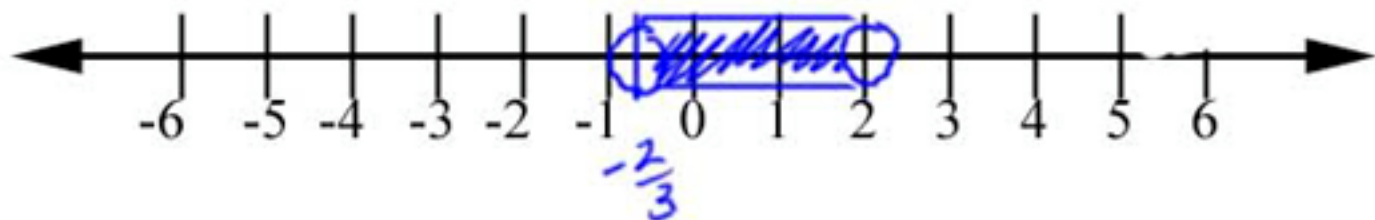
$$-3x + 2 < 4$$

$-2 \quad -2$

$$\frac{-3x}{-3} < \frac{2}{-3}$$

$$x > -\frac{2}{3}$$

$$-\frac{2}{3} < x < 2$$



Ex 3) Solve and graph:  $|4x + 2| \geq 6$

(+)

OR (-)

$$4x + 2 \geq 6$$

$-2 \quad -2$

$$4x \geq 4$$

$$x \geq 1$$

$$-(4x + 2) \geq 6$$

$$-4x - 2 \geq 6$$

$+2 \quad +2$

$$-4x \geq 8$$

$\underline{-4} \quad \underline{-4}$

$$x \leq -2$$

OR

