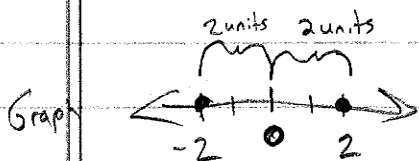


1.7a Absolute Value Equations

- Do the card activity

$$|x| = \begin{cases} \text{if } x \text{ is positive, is } x \\ \text{if } x = 0, \text{ is } 0 \\ \text{if } x \text{ is negative, is } -x \text{ (opposite of } x) \end{cases}$$

$$|x| = 2 \quad \text{or} \quad |x - 0| = 2$$



means the distance from 0 is 2 units

Solution

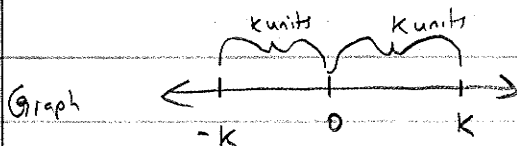
$$x = 2 \quad \text{or} \quad x = -2$$

$$x - 0 = 2 \quad \text{or} \quad x - 0 = -2$$

So

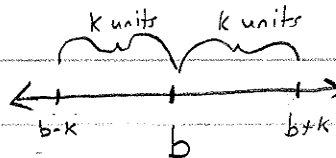
$$|x| = |x - 0| = k$$

means distance from 0 is k



$$|x - b| = k$$

the distance from b is k



Solution

$$x - 0 = k \quad \text{or} \quad x - 0 = -k$$

$$x = k \quad \text{or} \quad x = -k$$

$$x - b = k \quad \text{or} \quad x - b = -k$$

$$x = b + k \quad \text{or} \quad x = b - k$$

PSS 9-3000d



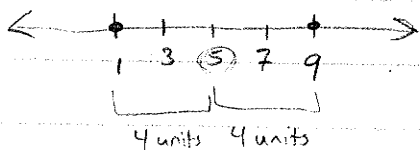
Example

Solve & plot

$$|x-5| = 4$$

$$x-5=4 \quad \text{or} \quad x-5=-4$$

$$x=9 \quad \text{or} \quad x=1$$



Solve & check

$$|5x-10| = 45$$

$$5x-10=45 \quad \text{or} \quad 5x-10=-45$$

$$\frac{5x}{5} = \frac{55}{5} \quad \text{or} \quad \frac{5x}{5} = \frac{-35}{5}$$

$$x=11 \quad \text{or} \quad x=-7$$

Check

$$|5(11)-10|$$

$$|55-10|$$

$$|45| = 45$$

$$|5(-7)-10|$$

$$|-35-10|$$

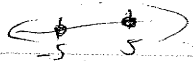
$$|-45| = 45$$

Yup!

Homwk

$$\textcircled{1} |x|=5$$

$$x=5 \quad \text{or} \quad x=-5$$



$$\textcircled{2} |x-3|=10$$

$$\textcircled{3} |x+2|=7$$

$$\textcircled{4} |3x-2|=13$$

$$\textcircled{5} |6-3x|=21$$

$$\textcircled{6} |2x+5|=3x$$

$$\textcircled{7} |3x-4|=x$$