3.3 – Solving Absolute Value Equations

The absolute value of a number is the distance the number is from "0" on the number line. If $|x| = 4$, then x can be both 4 and -4 because they are both 4 units away from 0.

Examples:

1. $|3x + 4| = 10$

$3x+4=10$ $\quad$ $3x+4=-10$

$3x=6$ $\quad$ $3x=-14$

$x=2$ $\quad$ $x=\frac{-14}{3}$

2. $|13x - 5x| = 2$

$13x-5x=2$ $\quad$ $13x-5x=-2$

$8x=2$ $\quad$ $8x=-2$

$x=\frac{2}{8}$ $\quad$ $x=\frac{-2}{8}$

$x=\frac{1}{4}$ $\quad$ $x=\frac{-1}{4}$

3.4 – Solving Absolute Value Inequalities

Absolute value inequalities with a less than symbol will always give you a "between" statement. Absolute value inequalities with a greater than symbol will always give you an "or" statement.

1. $|3x - 4| \leq 8$ less than = between

$-8 \leq 3x-4 \leq 8$

$-8 \leq 3x-4$ $\quad$ $3x-4 \leq 8$

$-8-3x \leq -4$ $\quad$ $3x \leq 12$

$-3x \leq 4$ $\quad$ $x \leq 4$

$x \geq -\frac{4}{3}$

Answer:

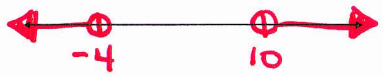
2. $|6 - 2x| > 14$ greater than = or

$6-2x>14$ or $6-2x<-14$

$-2x>8$ $\quad$ $-2x<-20$

$x<-4$ $\quad$ $x>10$

Answer:



3. $|3 - x| < 2$ less than = between

$-2 < 3-x < 2$

$-2 < 3-x$ $\quad$ $3-x < 2$

$-2+x < 3$ $\quad$ $-x < -1$

$x < 5$ $\quad$ $x > 1$

Answer: