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~~ABSOLUTE~~ ABSOLUTE VALUE EQUATIONS / INEQUALITIES

EX: SOLVE $|x| = 4$

$$x = 4 \quad \text{OR} \quad x = -4$$

$$x = 4, -4$$

EX: SOLVE $|3x + 2| = 7$

$$3x + 2 = 7$$

OR

$$3x + 2 = -7$$

$$3x = 5$$

$$3x = -9$$

$$x = \frac{5}{3}$$

OR

$$x = -3$$

$$x = \frac{5}{3}, -3$$

EX: SOLVE $2|3x - 1| + 5 = 33$

$$\frac{2|3x - 1|}{2} = \frac{28}{2}$$

$$|3x - 1| = 14$$

$$3x - 1 = 14$$

OR

$$3x - 1 = -14$$

$$3x = 15$$

$$3x = -13$$

$$x = 5$$

$$x = \frac{-13}{3}$$

$$x = 5, \frac{-13}{3}$$

Note: $|4x+3| = -6$ HAS NO SOLUTION.
WHY?

INEQUALITIES

① $|x| < 2$



$$-2 < x < 2$$

② $|x| \geq 2$



$$x \geq 2 \text{ OR } x \leq -2$$

Ex: Solve $|5x+3| - 7 < 34$

$$|5x+3| < 41$$

$$\begin{array}{ccc} -41 & < & 5x+3 & < & 41 \\ \underline{-3} & & \underline{-3} & & \underline{-3} \end{array}$$

$$\begin{array}{ccc} \underline{-44} & < & \underline{5x} & < & \underline{38} \\ \underline{5} & & \underline{5} & & \underline{5} \end{array}$$

$$\frac{-44}{5} < x < \frac{38}{5}$$



$$\text{Ex: } |-2x+3| + 7 > 9$$

$$|-2x+3| > 2$$

$$\begin{array}{l} -2x+3 > 2 \quad \text{OR} \quad -2x+3 < -2 \\ -2x > -1 \quad \quad \quad -2x < -5 \end{array}$$

$$x < \frac{1}{2} \quad \text{OR} \quad x > \frac{5}{2}$$