

Solving Absolute Value Equations

General procedure for solving 1st degree absolute value equations

Mnemonic: 2 & 2 (do 2 things, and then if yes, set up 2 equations—original and opposite)

1. Isolate the absolute value
2. Check to see if it's **Reasonable**...remember, the absolute value is always positive so it must be equal to a positive number. If **yes**, it's reasonable then write 2 equations. If **no**, then there is no solution
 - o examples
 - $|x+1| = 5$ results $x+1 = 5$ and $x+1 = -5$
 - $|x-3| = -4$ results no solution

Write your 2 equations:

1. Drop the absolute value set equal to the original
2. Drop the absolute value and set equal to the opposite

Example:

$$2|x-5| - 4 = 8$$

$$2|x-5| = 12$$

$$|x-5| = 6$$

$$x - 5 = 6 \text{ and } x - 5 = -6$$

$$x = 11 \quad x = -1$$

addition property of equality

multiplication property of equality

REASONABLE?

Can an absolute value of a number be equal to a positive 6?

YES...2 equations

one equation is the "original" and one equation is the "opposite"

solve

Practice:

$$|4x + 14| = 8$$

$$3|2w-7| + 10 = 9$$

$$4x + 14 =$$

$$4x + 14 =$$

$$3|x + 3| - 6 = 3$$

$$|2x - 6| = |x + 1|$$