

Solving Linear equations in one variable (including absolute value equations) :

Linear Equation

A linear equation forms a straight line on a graph. You solve equations by performing inverse operations. Addition and subtraction are inverse operations, so are multiplication and division.

Here is a general strategy for solving linear equations. One new piece of strategy is a suggestions to "clear an equation of fractions" as a first step. Doing so makes the equation more manageable, since operating on integers is more convenient than operating on fractions.

- Step 1: Multiply on both sides by the LCD to clear the equation of fractions if they occur.
- Step 2: Use the distributive property to remove parentheses if they occur.
- Step 3: Simplify each side of the equation by combining like terms.
- Step 4: Get all variable terms on one side and all numbers on the other side by using the addition property of equality.
- Step 5: Get the variable alone by using the multiplication property of equality.
- Step 6: Check the solution by substituting it into the original equation.

Absolute Value Equations

The absolute value of any number is always positive or zero. If $|x| = 5$, then the solutions for x are $x = 5$ and $x = -5$. You can use a similar thought process to solve multi-step absolute value equations. To solve an absolute value equations follow these steps:

- Step 1: Isolate the absolute value term on the left side of the equal sign.
- Step 2: You will write two different equations separated by the word "or."
- Step 3: In one equation, make the expression inside the $| |$ equal to the number on the right side of the equal sign.

Step 4: In the other equation, make the expression inside the $||$ equal to the opposite of the number on the right side of the equal sign.

Step 5: Solve each equation and check each solution.

Solve linear inequalities in one variable :

Linear inequality

A linear inequality describes a portion of the graph that uses a straight line as its boundary. Any coordinate located in the portion of the graph that uses a straight line as its boundary is a solution to the inequality.

Solution of an inequality

A solution of an inequality is a value of the variable that makes the inequality a true statement. The solution set is the set of all solutions. For the inequality $x < 3$, replacing x with any number less than 3, that is, to the left of 3 on the number line, makes the resulting inequality true. This means that any number less than 3 is a solution of the inequality $x < 3$.

Solving Inequalities

To solve inequalities ($<$, $>$, \leq , or \geq), follow the same steps that apply to equations with one additional rule. If you multiply or divide by a negative number, you will need to flip the inequality sign to the opposite direction. Make sure you check all your solutions.

Examples of "flipping" the inequality

- $< \Rightarrow >$
- $> \Rightarrow <$
- $\leq \Rightarrow \geq$
- $\geq \Rightarrow \leq$