

Steps for Solving Linear Equations

1. Remove any parentheses and combine like terms, if possible, on each side of the equation.
2. Clear any fractions by multiplying all terms on both sides by the LCD (least common denominator).
3. Group like terms on each side of the equal sign.
4. Isolate the "x term" (variable) on one side of the equation by adding or subtracting to combine like terms across the equal sign.
5. Divide or multiply both sides of the equation by the coefficient of the variable to solve for "x".
6. Check the solution by substituting your answer into the original equation wherever you have a variable. If the solution is correct, both sides of the equation will be equal.

Example 1:

$$\begin{array}{l} \text{Step 1: remove } () \quad 3/4 (X - 3) = 5/8 X \\ \text{Step 2: LCD = 8} \quad 3/4 X - 9/4 = 5/8 X \\ \quad 8(3/4 X) - 8(9/4) = 8(5/8 X) \\ \quad 6X - 18 = 5X \\ \text{Step 4: Isolate x-term} \quad \underline{-6X} \quad \underline{-6X} \\ \quad -18 = -1X \\ \text{Step 5: divide to solve for x} \quad -18/-1 = -1X/-1 \\ \\ \quad 18 = X \\ \\ \text{Step 6: check} \quad 3/4(18-3) = 5/8(18) \\ \quad 3/4(15) = 5/8(18) \\ \quad 45/4 = 5/4(9) \\ \quad 45/4 = 45/4 \text{ checks} \end{array}$$

The solution is X = 18.

Example 2:

$$\begin{array}{l} \text{Step 1: remove } () \quad 2(w - 3) - 3(3w - 2) = -14 \\ \text{Step 3: group like terms} \quad 2w - 6 - 9w + 6 = -14 \\ \quad 2w - 9w - 6 + 6 = -14 \\ \quad \underline{-7w} = \underline{-14} \\ \text{Step 5: divide to solve for w} \quad -7 = -7 \\ \\ \quad w = 2 \end{array}$$

$$\begin{array}{l} \text{Step 5L check} \quad 2(2 - 3) - 3(3(2) - 2) = -14 \\ \quad 2(-1) - 3(6 - 2) = -14 \\ \quad 2(-1) - 3(4) = -14 \\ \quad -2 - 12 = -14 \\ \quad -14 = -14 \end{array}$$

The solution is w = 2.