

MTH 143 Section 1.1 – Solutions of Linear Equations and Inequalities in One Variable

An equation is a statement that 2 quantities or algebraic expressions are equal

For example: $3+4=7$ $2x-1=5$

The letter x in $2x-1=5$ is a variable because it represents an unknown quantity.
The equation may or may not be true, depending on the value of x .

For example: $2x-1=5$ is only true when $x=3$

Finding the value(s) that make the equation true is called solving the equation.

An identity is always true.

For example: $3+1=4$ $2(x-3)=2x-6$

A (conditional) equation is only true for certain values called solutions.

Equations with the same solutions are equivalent.

For example: $\frac{2x-4}{2}=3$ $2x-4=6$ $x=5$] equivalent

An equation with only one variable and no exponents is called a linear equation and has degree one, where the degree is the highest exponent.

Solving Linear Equations

Remember: order of operations
distribution
 $a(b+c) = ab+ac$
check your answers

P
E
MD
AS] left to right
*do whichever one comes first

Some Examples:

$$3(x-4) = 4 - 2(x+2)$$

$$3x-12=4-2x-4$$

$$3x-12=-2x$$

$$5x=12$$

$$\boxed{x = \frac{12}{5}}$$

$$\frac{3x}{4} - \frac{1}{3} = 1 - \frac{2}{3}\left(x - \frac{1}{6}\right)$$

$$36\left(\frac{3x}{4} - \frac{1}{3} = 1 - \frac{2}{3}x + \frac{2}{18}\right)$$

$$\text{LCD: } 36$$

$$27x-12=36-24x+4$$

$$51x=52$$

$$\boxed{x = \frac{52}{51}}$$