

## Solving Linear Equations

### Linear Equation

An equation where the only exponent involved with the variable is 1 is called a linear equation.

Examples:

$$3x + 2 = 8$$

$$2(x + 4) - x + 7 = 6 \text{ are both linear equations}$$

The best way to look at the procedures for solving a linear equation is to undo the operations that have been done to the variable.

Example:

Equation	Done to x	How undone
$3x + 2 = 8$	2 added to $3x$	Subtract 2
$3x + 2 - 2 = 8 - 2$		
$3x = 6$	Multiplied by 3	Divide by 3
$3x \div 3 = 6 \div 3$		
$x = 2$		

We also need to be able to get the variables on one side and the constants on the other sides.

Example:

$3x + 2 = x - 6$	Move x to left by subtracting x from both sides
$3x + 2 - x = x - 6 + x$	
$2x + 2 = 6$	Subtract 2 from both sides
$2x + 2 - 2 = 6 - 2$	
$2x = 4$	Divide both sides by 2
$2x \div 2 = 4 \div 2$	
$x = 2$	Done

### Procedures for Solving Linear Equations

1. Perform any implied operations (multiply through parenthesis, etc.)
2. Combine like terms on each side
3. Perform necessary operations to separate constants and variables
4. Combine like terms as necessary
5. Multiply or divide to make the numerical coefficient 1