Déjà Vu, It's Algebra 2!

Lesson 03

Solving Linear Equations

Some Basic Terminology:

Variables – unknown quantities in an equation or expression that are usually represented by a single letter.

Terms – variables or numbers that are added or subtracted, separated by a "+" sign or a "-" sign

Factors – variables or numbers that are either multiplied or divided in each term.

Algebraic expression – a collection of factors or terms containing variables or numbers. Expressions do _____ contain an equal "=" sign.

Equation – a mathematical sentence stating that two expressions are equivalent. The expressions are connected by the equal "=" sign.

Solution Set to an equation – the set of values of the variable in an equation that make the equation a true statement.

A **LINEAR** equation in one variable is one that can be written in the following form:

$$ax + b = 0$$

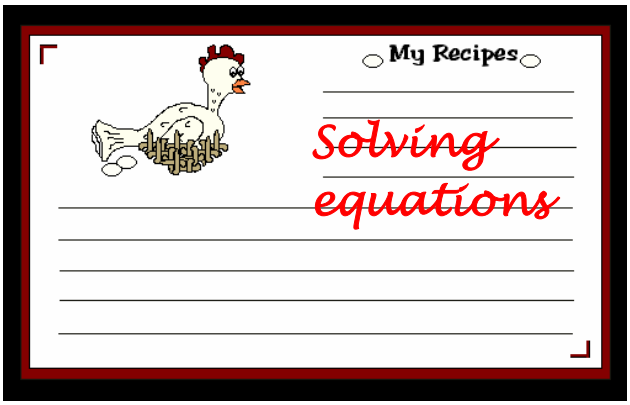
$a, b \in \mathbb{R}, a \neq 0$

x is our variable.

Linear	*Nonlinear*
$4x = 8$	$3\sqrt{x} + 1 = 32$
$3x - \frac{2}{3}x = -9$	$\frac{2}{x^2} = 41$
$2x - 5 = 0.1x + 2$	$3 - 2^x = -5$
$2(t-1) + t = -\sqrt{3}t$	$2t(t-1) + t = -\sqrt{3}t$

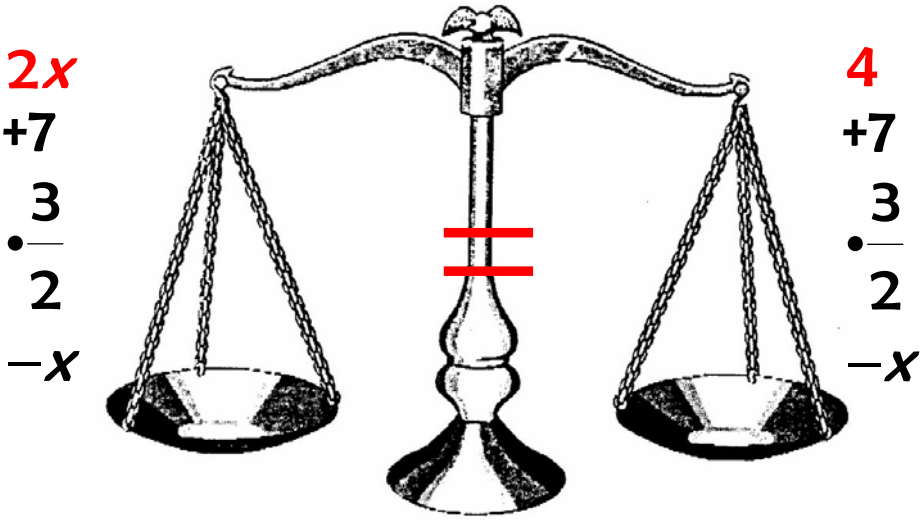
So how do go about finding the solution to a linear equation?

We'd like to establish a systematic process for doing so, a set of algorithms, or a recipe, that allows us to isolate the variable term on one side and its coveted value on the other.



Because we are working with equations there are some operations that are legal (do not change the value of the solution) and some that are illegal.

Think of an equation as a balanced scale. Whatever we do to one side (add, subtract, multiply, divide) we must do the same to the other side.



Here is your algebraic recipe for solving linear equations:

To Solve Linear Equations:

1. Expand out equation
2. Collect like terms (variables on left, numbers on the right.)
3. Solve for indicated variable

For best results, let equation stand for 1 minute afterwards to marvel at your work!

Example 1:

$4(m+12)=-36$

Example 2:

$$3k - 14k + 25 = 2\left(1 - 3k - 6\right)$$

Example 3:

$$\frac{-2}{p+5} = \frac{8}{p-3}$$

Déjà RE-Vu

Two special types of linear equations:

TYPE 1:

$$3v - 9 - 4v = -(5 + v)$$

TYPE 2:

$$2(x - 6) = -5x - 12 + 7x$$