Systems of Linear Equations

September 11, 2017 20:39

Linear Equations

Only simple variables are allowed. No x^2, y^3, $\sqrt{x}$, etc:

Examples: These are linear equations:

- ✓ $y = 3x - 6$
- ✓ $y - 2 = 3(x + 1)$
- ✓ $y + 2x - 2 = 0$
- ✓ $5x = 6$
- ✓ $y/2 = 3$

Examples: These are NOT linear equations:

- ✗ $y^2 - 2 = 0$
- ✗ $3\sqrt{x} - y = 6$
- ✗ $x^3/2 = 16$

Common Variables

For the equations to "work together" they share one or more variables:

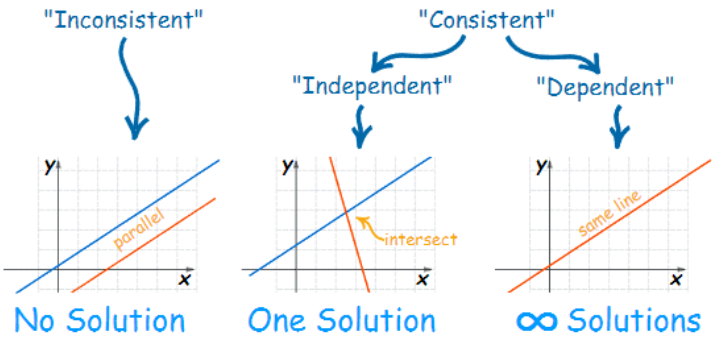
A System of Equations has two or more equations in one or more variables

Solutions

there are only three possible cases:

- **No** solution
- **One** solution
- **Infinitely many** solutions

When there is no solution the equations are called "inconsistent". **One** or infinitely many solutions are called "consistent".



Independent

"Independent" means that each equation gives new information. Otherwise they are "Dependent".
Also called "Linear Independence" and "Linear Dependence"

Solving By Elimination

The idea is that we can safely:

- **multiply** an equation by a constant (except zero),
- **add** (or subtract) an equation on to another equation.

Like in these examples: