Slide 1

Solving Simultaneous or a System of Equations

Slide 2

A simultaneous equation, or a system of equations, is a group of more than one equation and more than one variable. The problems we will solve now have two equations and two variables.

We have two main methods of solving a system of two equations and two unknowns. The two methods are substitution and elimination (or linear combination).

Slide 3

Solving by substitution:

Example: Solve the following simultaneous equations by substitution.

$$y = \tfrac{2}{3}x - 1$$
$$y = -\tfrac{2}{3}x + 3$$

Solution: (3, 1)

Slide 4

Solving by elimination:

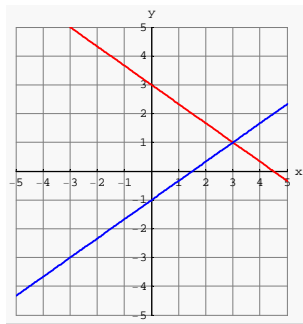Example: Solve the following system of equations by elimination.

$$2x + 3y = 9$$
$$-2x + 3y = -3$$

Solution: (3, 1)

Slide 5

We can also look at the graphs of these two equations. Draw the graphs of these two lines and find where they intersect.

$$2x + 3y = 9$$
$$-2x + 3y = -3$$

Slide 6

Solve the following simultaneous equations:

$$7x - 4y = 11$$
$$x - 4y = 5$$

Solution: (1, -1)

Solve the following system of equations:

$$-11x - y = -9$$
$$-14x - 3y = -8$$

Solution: (1, -2)

Solve the following simultaneous equations using substitution:

$$y = 9 - x$$
$$2x + 3y = 21$$

Solution: (6, 3)

Solve the following system of equations using linear combination:

$$3x + 2y = 7$$
$$2x - 5y = 11$$

Solution: (3, -1)

Solve the following simultaneous equations:

$$5a = 7b - 7$$
$$a - b = 1$$

Solution: (7, 6)

Solve the following simultaneous equations:

$$2x - 3y = 4$$
$$4(x - 2) = 6y$$

Solution: Every point on the line $2x - 3y = 4$ is a solution

Solve the following simultaneous equations:

$$3x - y = 2$$
$$6x - 8 = 2y$$

Solution: No Solutions

Solve the following simultaneous equations:

$$2d = c - 4$$
$$3c - 6 = 9d$$

Solution: (8, 2)

Solve the following simultaneous equations using substitution:

$$4a + b = -3$$
$$a = 6 + 2b$$

Solution: (7, 6)

Solve the following simultaneous equations using elimination:

$$-3x = 3(1 - y)$$
$$y - x = 1$$

Solution: Every point on the line $y = x + 1$ is a solution

Solve the following system of equations using whatever method you choose:

$$x + 2y = 3$$
$$4y + 16 = -2x$$

Solution: No Solutions

Solve the following system of equations using whatever method you choose:

$$4y + 6 = 2x$$
$$x - 7y = -2$$

Solution: (5, 1)