

Simultaneous Equations - Lesson 3

Simultaneous Equations 3 (Multiplying 2 Equations)

LI

- Solve a pair of equations for 2 missing variables.

SC

- Multiply both equations to get same numerical coefficients.
- 2-step equations.

Reminder

- Signs **same** - **subtract** equations.
- Signs **different** - **add** equations.

Example 1

Solve,

$$3x - 5y = 11 \quad (1) \times 2$$

$$2x + 3y = 1 \quad (2) \times 3$$

$$6x - 10y = 22 \quad (3)$$

$$6x + 9y = 3 \quad (4)$$

Signs of x are the same (+), so subtract : $(3) - (4)$

$$-19y = 19$$

$$\Rightarrow \underline{y = -1}$$

Substitute $y = -1$ into (2) :

$$2x + 3y = 1$$

$$\therefore 2x + 3(-1) = 1$$

$$\Rightarrow 2x - 3 = 1$$

$$\Rightarrow 2x = 4$$

$$\Rightarrow \underline{x = 2}$$

$$\therefore \boxed{x = 2, y = -1}$$

Example 2

Solve,

$$4x + 3y = -1 \quad (1) \quad \times 5$$

$$6x + 5y = -2 \quad (2) \quad \times 3$$

$$20x + 15y = -5 \quad (3)$$

$$18x + 15y = -6 \quad (4)$$

Signs of y are the same (+), so subtract : $(3) - (4)$

$$2x = 1$$

$$\Rightarrow \underline{x = 1/2}$$

Substitute $x = 1/2$ into (1) :

$$4x + 3y = -1$$

$$\therefore 4(1/2) + 3y = -1$$

$$\Rightarrow 2 + 3y = -1$$

$$\Rightarrow 3y = -3$$

$$\Rightarrow \underline{y = -1}$$

$$\therefore \boxed{x = 1/2, y = -1}$$

Questions

Solve each of the following pairs of equations by elimination.

a	$3x - 5y = 11$	b	$4x + 5y = -7$	c	$7x - 3y = -8$	d	$2x + 5y = 0$
	$2x + 3y = 1$		$3x + 2y = -7$		$2x + 4y = -12$		$3x - 8y = 31$
e	$2x - 3y = -27$	f	$3x + 4y = -4$	g	$5p - 4q = 22$	h	$2f - 3g = 6$
	$3x + 2y = -8$		$7x + 6y = -11$		$3p + 5q = -9$		$5f - 4g = 1$

Answers

Solve each of the following pairs of equations by elimination.

a	$3x - 5y = 11$	b	$4x + 5y = -7$	c	$7x - 3y = -8$	d	$2x + 5y = 0$
	$2x + 3y = 1$		$3x + 2y = -7$		$2x + 4y = -12$		$3x - 8y = 31$
e	$2x - 3y = -27$	f	$3x + 4y = -4$	g	$5p - 4q = 22$	h	$2f - 3g = 6$
	$3x + 2y = -8$		$7x + 6y = -11$		$3p + 5q = -9$		$5f - 4g = 1$

a $x = 2, y = -1$

b $x = -3, y = 1$

c $x = -2, y = -2$

d $x = 5, y = -2$

e $x = -6, y = 5$

f $x = -2, y = \frac{1}{2}$

g $p = 2, q = -3$

h $f = -3, g = -4$