Solving Simultaneous Equations by Elimination

Example A: $3x + y = 9$ (eqn 1)
$7x - y = 11$ (eqn 2)

$3x + y = 9$ +   sub. x = 2 in eqn 1: $3 \times 2 + y = 9$
$\underline{7x - y = 11}$ $6 + y = 9$ (−6)
$10x = 20$ (÷2)   **y = 3**
     x = 2

Check in eqn 2: $7 \times 2 - 3 = 11$ ✓

Exercise A: Solve the following simultaneous equations. Don't forget to show all your working out, and to check by substitution at the end.

1) $x + y = 7$
    $x - y = 1$

2) $5x + y = 23$
    $2x + y = 11$

3) $2x + 3y = 3$
    $5x + 3y = 12$

4) $3m - 4n = -18$
    $5m - 4n = -22$

5) $4x + 3y = 1$
    $x - 3y = -11$

6) $2n - 5m = 3$
    $5m + n = 9$

Example B: $3x + 2y = 26$ (eqn 1)
$4x + y = 28$ (eqn 2)   eqn 2 × 2 : $8x + 2y = 56$ (eqn 3)

eqn 3 − eqn 1: $8x + 2y = 56$ −   sub. x = 6 in eqn 1: $3 \times 6 + 2y = 26$
                   $\underline{3x + 2y = 26}$ $18 + 2y = 26$ (−18)
                   $5x = 30$ (÷5) $2y = 8$ (÷2)
                        x = 6   **y = 4**

check in eqn 2: $4 \times 6 + 4 = 28$
                  $24 + 4 = 28$ ✓

Exercise B: Solve the following simultaneous equations. Don't forget to show all your working out, and to check by substitution at the end.

1. $3x + 2y = 7$
    $4x - y = 13$

2. $4a - 3b = -6$
    $a + 2b = 1$

3. $3x + 5y = 13$
    $7x - 2y = 3$

4. $4x + 3y = 11$
    $3x + 2y = 8$

5. $7a - 3b = 10$
    $3a - 7b = 10$

6. $4a + 3b = 10$
    $4b + 3a = 11$

Homework: Solving Simultaneous Equations by Elimination

Exercise 1:

Solve these simultaneous equations by elimination. You must show all working.

1.	$3p + q = 7$	2.	$2x + 3y = 8$	3.	$5x + 2y = 16$
	$2p - q = 3$		$2x - 3y = 2$		$3x + 2y = 8$

4.	$7x - 3y = 13$	5.	$4p + 3q = 6$	6.	$4p - q = 15$
	$4x - 3y = 7$		$2p - 3q = 12$		$2p - q = 9$

Exercise 2:

Solve these simultaneous equations by elimination. You must show all working.

1.	$3x + 4y = 9$	2.	$3x + 2y = 2$	3.	$4x - y = 9$
	$3x + y = 7$		$x + y = 2$		$2x + 3y = 1$

4.	$4d - 3e = 26$	5.	$4x + 3y = 11$	6.	$5m - 4n = 17$
	$d - 3e = 11$		$3x - 2y = 21$		$2m - 3n = 18$