

Solving Simultaneous Equations Algebraically

Starter

We will use these skills when solving simultaneous equations algebraically.

1. (Review of previous material) Collecting like terms

Simplify: (a) $4x + 3y + 5x - 3y$ (b) $7x - 5y - (7x + 2y)$

Working: (a) $9x$

(b) $7x - 5y - (7x + 2y) = 7x - 5y - 7x - 2y = -7y$

2. (Review of previous material) Substituting

Find the value of x when $y = 2$ and $3x - 5y = 14$

Working: When $y = 2$: $3x - 10 = 14$ *add 10 to both sides*
 $3x = 24$ *divide both sides by 8*
 $x = 8$

3. (Review of previous material) Solving linear equations

Solve: (a) $3x = 12$ (b) $8 + 7y = 29$

Working: (a) $x = 4$ *divide both sides by 3*

(b) $8 + 7y = 29$ *subtract 8 from both sides*
 $7y = 21$ *divide both sides by 7*
 $y = 3$

E.g. 1

$$\begin{array}{r} 4x + 7y = 26 \\ 4x - 3y = 6 \\ \text{Sub.} \quad \underline{10y = 20} \\ \quad \quad y = 2 \\ \underline{4x + 14 = 26} \\ \quad \quad 4x = 12 \\ \quad \quad \underline{x = 3} \\ \quad \quad x = 3, y = 2 \end{array}$$

E.g. 2

$$\begin{array}{r} 2x - y = 3 \\ x + y = 9 \\ \text{Add} \quad \underline{3x = 12} \\ \quad \quad x = 4 \\ \underline{4 + y = 9} \\ \quad \quad y = 5 \\ x = 4, y = 5 \end{array}$$

E.g. 3

$$\begin{array}{r} 3x + y = -1 \\ -3x + 5y = 31 \\ \text{Add} \quad \underline{6y = 30} \\ \quad \quad y = 5 \\ \underline{3x + 5 = -1} \\ \quad \quad 3x = -6 \\ \quad \quad \underline{x = -2} \\ x = -2, y = 5 \end{array}$$

1. Eliminate x
2. Different signs so add
3. Solve
4. Replace y by 5
5. Solve
6. Communicate

E.g. 4

$$\begin{array}{r} 5x + 2y = 24 \\ -4x + 2y = -30 \\ \text{Sub} \quad \underline{9x = 54} \\ \quad \quad x = 6 \\ \underline{30 + 2y = 24} \\ \quad \quad 2y = -6 \\ \quad \quad \underline{y = -3} \\ x = 6, y = -3 \end{array}$$

1. Eliminate y
2. Same signs so subtract
3. Solve
4. Replace x by 6
5. Solve
6. Communicate

E.g. 5 $x - 5y = -21$
 $2x + 5y = 18$
Add $3x = -3$
 $x = -1$
 $-2 + 5y = 18$
 $5y = 20$
 $y = 4$
 $x = -1, y = 4$

1. Eliminate y
2. Different signs so add
3. Solve
4. Replace x by -1
5. Solve
6. Communicate

E.g. 6 $-x + 7y = 19$
 $-x + 2y = 4$
Sub $5y = 15$
 $y = 3$
 $-x + 21 = 19$
 $-x = -2$
 $x = 2$
 $x = 2, y = 3$

1. Eliminate x
2. Same signs so subtract
3. Solve
4. Replace y by 3
5. Solve
6. Communicate

Video A:
Video B:

[Solving simultaneous equations algebraically](#)
[Solving simultaneous equations algebraically](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook:

A*-G class textbook:

9-1 homework book:

A*-G homework book:

p381 M12.3 Qu 1-12

p344 M12.3 Qu 1-12

p127 M12.3 Qu 1-10

p96 M12.3 Qu 1-10

[Homework book answers \(only available during a lockdown\)](#)