

Examples - Solving Linear Simultaneous Equations using the elimination method

Example 1 Solve the simultaneous equations $3x + y = 5$ and $x + y = 1$

$\begin{array}{r} 3x + y = 5 \\ - \quad x + y = 1 \\ \hline 2x \quad \quad = 4 \end{array}$ So $x = 2$ Using $x + y = 1$ $2 + y = 1$ So $y = -1$ Check: equation 1: $3 \times 2 + (-1) = 5$ YES equation 2: $2 + (-1) = 1$ YES	1 Subtract the second equation from the first equation to eliminate the y term. 2 To find the value of y, substitute $x = 2$ into one of the original equations. 3 Substitute the values of x and y into both equations to check your answers.
---	---

Example 2 Solve $x + 2y = 13$ and $5x - 2y = 5$ simultaneously.

$\begin{array}{r} x + 2y = 13 \\ + \quad 5x - 2y = 5 \\ \hline 6x \quad \quad = 18 \end{array}$ So $x = 3$ Using $x + 2y = 13$ $3 + 2y = 13$ So $y = 5$ Check: equation 1: $3 + 2 \times 5 = 13$ YES equation 2: $5 \times 3 - 2 \times 5 = 5$ YES	1 Add the two equations together to eliminate the y term. 2 To find the value of y, substitute $x = 3$ into one of the original equations. 3 Substitute the values of x and y into both equations to check your answers.
---	---

Example 3 Solve $2x + 3y = 2$ and $5x + 4y = 12$ simultaneously.

$\begin{array}{rcl} (2x + 3y = 2) \times 4 & \rightarrow & 8x + 12y = 8 \\ (5x + 4y = 12) \times 3 & \rightarrow & 15x + 12y = 36 \\ & & \hline & & 7x = 28 \end{array}$ So $x = 4$ Using $2x + 3y = 2$ $2 \times 4 + 3y = 2$ So $y = -2$ Check: equation 1: $2 \times 4 + 3 \times (-2) = 2$ YES equation 2: $5 \times 4 + 4 \times (-2) = 12$ YES	1 Multiply the first equation by 4 and the second equation by 3 to make the coefficient of y the same for both equations. Then subtract the first equation from the second equation to eliminate the y term. 2 To find the value of y, substitute $x = 4$ into one of the original equations. 3 Substitute the values of x and y into both equations to check your answers.
--	---