

Examples - Solving Linear Simultaneous Equations using the substitution method

Example 1 Solve the simultaneous equations $y = 2x + 1$ and $5x + 3y = 14$

$5x + 3(2x + 1) = 14$ $5x + 6x + 3 = 14$ $11x + 3 = 14$ $11x = 11$ So $x = 1$ Using $y = 2x + 1$ $y = 2 \times 1 + 1$ So $y = 3$ Check: equation 1: $3 = 2 \times 1 + 1$ YES equation 2: $5 \times 1 + 3 \times 3 = 14$ YES	1 Substitute $2x + 1$ for y into the second equation. 2 Expand the brackets and simplify. 3 Work out the value of x. 4 To find the value of y, substitute $x = 1$ into one of the original equations. 5 Substitute the values of x and y into both equations to check your answers.
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Example 2 Solve $2x - y = 16$ and $4x + 3y = -3$ simultaneously.

$y = 2x - 16$ $4x + 3(2x - 16) = -3$ $4x + 6x - 48 = -3$ $10x - 48 = -3$ $10x = 45$ So $x = 4\frac{1}{2}$ Using $y = 2x - 16$ $y = 2 \times 4\frac{1}{2} - 16$ So $y = -7$ Check: equation 1: $2 \times 4\frac{1}{2} - (-7) = 16$ YES equation 2: $4 \times 4\frac{1}{2} + 3 \times (-7) = -3$ YES	1 Rearrange the first equation. 2 Substitute $2x - 16$ for y into the second equation. 3 Expand the brackets and simplify. 4 Work out the value of x. 5 To find the value of y, substitute $x = 4\frac{1}{2}$ into one of the original equations. 6 Substitute the values of x and y into both equations to check your answers.
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