

Solve a pair of linear simultaneous equations by adding equations

1 Simplify the expressions.

a) $-5a + 5a \equiv 0$

b) $4b + (-4b) \equiv 0$

c) $6y + 2x + (-6y) + x \equiv 3x$

d) $x + (-x) - y - y \equiv -2y$

2 Here is a pair of simultaneous equations.

$$\begin{aligned} 2x + y &= 10 \\ 5x - y &= 18 \end{aligned}$$

a) By adding the equations together, find the value of x .

$x = 4$

b) Now find the value of y .

$y = 2$

3 Solve the simultaneous equations.

$$\begin{aligned} -3x + 5y &= 22 \\ 3x + y &= 8 \end{aligned}$$

$x = 1$ $y = 5$

4 Mo is solving the simultaneous equations.

$$\begin{aligned} 4y + 4x &= 0 \\ 4y - 4x &= 24 \end{aligned}$$

a) Mo says, "It is impossible to solve the simultaneous equations as they both have $4x$ and $4y$ in them, so both letters would be eliminated if you added them or subtracted them."

Explain why Mo is wrong.

If you subtract only the 'y's cancel to give $8x = -24$
If you add only the 'x's cancel to give $8y = 24$

b) Solve the simultaneous equations.

$x = -3$ $y = 3$

5 Here is a pair of simultaneous equations.

$$\begin{aligned} 9 &= 2y - 3x \\ 5 &= -2y - 4x \end{aligned}$$

a) Which of these is the correct next step in solving the simultaneous equations? Tick your answer.

- Add them to get $14 = x$
- Add them to get $14 = -x$
- Add them to get $14 = -7x$ ✓

b) Continue the correct solution to find the values of x and y .

$x = -2$ $y = 1.5$

- 6 Brett is trying to solve the simultaneous equations.

$$\begin{aligned} 5u + 3w &= 7 \\ 6u &= 3w + 15 \end{aligned}$$

- a) Brett thinks you subtract the equations to give $u = 8$

Explain why he is incorrect.

The second equation needs rearranging first.

- b) Solve the simultaneous equations.

$$u = 2 \quad w = -1$$

- 7 Solve the simultaneous equations.

$$\begin{aligned} 2y &= 3x - 12 \\ 3x - 5y &= 21 \end{aligned}$$

$$x = 2 \quad y = -3$$

- 8 For each of the pairs of simultaneous equations, decide whether you would add or subtract them to eliminate one of the letters.

Then solve the equations.

a)
$$\begin{aligned} 21 &= 5a - 2b \\ 18 &= 4b + 5a \end{aligned}$$

b)
$$\begin{aligned} 3y &= 15 - 2x \\ 2x - y &= 17 \end{aligned}$$

$$a = 4 \quad b = -0.5$$

$$x = 8.25 \quad y = -0.5$$

c)
$$\begin{aligned} 5m - 2p &= 0 \\ 5m + 2p &= 20 \end{aligned}$$

d)
$$\begin{aligned} 2n + 12 &= -3k \\ k &= 2n - 8 \end{aligned}$$

$$m = 2 \quad p = 5$$

$$k = -5 \quad n = 1.5$$

- 9 Dexter wants to buy a hat and a scarf.

- a) The cost of a hat (h) and a scarf (s) is £12.25

Tick the equation that represents this.

$$h + s = 12.25$$

$$h - s = 12.25$$

$$h + 12.25 = s$$

$$s + 12.25 = h$$

Explain your choice.

- b) The hat costs £1.75 more than the scarf.

Tick the equation that represents this.

$$h + s = 1.75$$

$$s + h = 1.75$$

$$h - s = 1.75$$

$$s + s = 1.75$$

Explain your choice.

- c) Work out the prices of the hat and the scarf.

$$\text{hat} = £7 \quad \text{scarf} = £5.25$$