

1 Simultaneous equations

Solve the simultaneous equations

$$4x + 3y = 26$$

$$4x - y = 10$$

subtract: $4y = 16, y = 4$

$4x - 4 = 10, x = 3.5, y = 4$

2 Multiplying first

Solve the simultaneous equations

$$3x + 4y = 2$$

$$5x - 3y = 13$$

$\times 3$ and $\times 4: 9x + 12y = 6, 20x - 12y = 52$

add: $29x = 58$

$x = 2, y = -1$

3 Solving by substitution

Solve the simultaneous equations

$$y = 3x - 7$$

$$5x - 2y = 9$$

$5x - 2(3x - 7) = 9$

$-x + 14 = 9$

$x = 5, y = 8$

4 Forming simultaneous equations

3 roses and 4 tulips cost £9.35. 5 roses and 2 tulips cost £11.15.

a) Find the cost of one rose and the cost of one tulip.

b) Sam spends £18.70 on 6 roses and some tulips.

How many tulips does she buy?

$3r + 4t = 9.35, 5r + 2t = 11.15$

a) $7r = 12.95$: rose £1.85, tulip £0.95

b) $18.70 - 11.10 = 7.60, 7.60 \div 0.95 = 8$

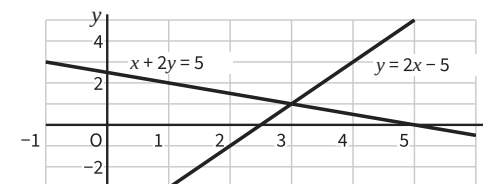
Simultaneous equations revision mat answers

Higher A

5 Solving with graphs

a) Use the graph to solve $x + 2y = 5$ and $y = 2x - 5$.

b) Explain why $y = 2x - 5$ and $4x - 2y = 3$ have no solution.



a) $x = 3, y = 1$

b) $y = 2x - 1.5$: the same gradient, parallel

6 Linear and quadratic

Solve the simultaneous equations

$$y = x^2 - 3x + 1$$

$$y = 2x - 3$$

$x^2 - 3x + 1 = 2x - 3$

$x^2 - 5x + 4 = 0, (x - 1)(x - 4) = 0$

$x = 1, y = -1$ and $x = 4, y = 5$

7 Linear and quadratic: circles

The line $x + y = 4$ meets the circle $x^2 + y^2 = 10$ at A and B.

a) Find the coordinates of A and B.

b) Find the length AB. Leave your answer as a surd.

$x^2 + (4 - x)^2 = 10, x^2 - 4x + 3 = 0$

a) (1, 3) and (3, 1)

b) $\sqrt{(2^2 + 2^2)} = \sqrt{8} = 2\sqrt{2}$

8 Linear and quadratic: forming

A rectangle is x cm long and y cm wide. Its perimeter is 26 cm and its area is 40 cm^2 .

a) Show that $x^2 - 13x + 40 = 0$.

b) Find the length and the width of the rectangle.

a) $x + y = 13, y = 13 - x, x(13 - x) = 40$

$13x - x^2 = 40, \text{ so } x^2 - 13x + 40 = 0$

b) $(x - 5)(x - 8) = 0$: 8 cm by 5 cm