

GCSE Maths: Simultaneous equations: elimination (Higher): answers

GCSE Maths - Quadratic and Simultaneous Equations - Higher - Lesson 14.5

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch14-quadratics-simultaneous/higher/simultaneous-equations-elimination/

Exercise 14E Simultaneous equations: elimination Non-calculator

1 Solve each pair of simultaneous equations. Just add or subtract: no multiplying is needed.

(a) $x + y = 9$ and $x - y = 3$

Answer: $x = 6, y = 3$

(b) $2x + y = 11$ and $x + y = 7$

Answer: $x = 4, y = 3$

(c) $3x + y = 14$ and $x + y = 8$

Answer: $x = 3, y = 5$

(d) $x + 2y = 9$ and $x + y = 6$

Answer: $x = 3, y = 3$

(e) $4x + 3y = 27$ and $4x - y = 7$

Answer: $x = 3, y = 5$

(f) $5x + 2y = 24$ and $3x - 2y = 8$

Answer: $x = 4, y = 2$

2 Solve the simultaneous equations

$$2x + 3y = 12$$

$$2x + y = 8$$

Answer: $x = 3, y = 2$

3 Solve the simultaneous equations

$$5x + 2y = 19$$

$$3x - 2y = 5$$

Answer: $x = 3, y = 2$

4 Solve each pair. Multiply **one** equation first.

(a) $2x + y = 8$ and $3x - 2y = 5$

Answer: $x = 3, y = 2$

(b) $x + 3y = 11$ and $2x - y = 1$

Answer: $x = 2, y = 3$

(c) $3x + 2y = 14$ and $x - y = 3$

Answer: $x = 4, y = 1$

(d) $5x - y = 13$ and $2x + 3y = 12$

Answer: $x = 3, y = 2$

(e) $x + 2y = 8$ and $3x + 4y = 20$

Answer: $x = 4, y = 2$

(f) $4x + y = 14$ and $3x - 2y = 5$

Answer: $x = 3, y = 2$

5 Solve each pair. Multiply **both** equations.

(a) $2x + 3y = 13$ and $3x + 2y = 12$

Answer: $x = 2, y = 3$

(b) $3x + 4y = 24$ and $2x + 3y = 17$

Answer: $x = 4, y = 3$

(c) $5x + 2y = 19$ and $3x + 5y = 19$

Answer: $x = 3, y = 2$

(d) $4x - 3y = 6$ and $3x + 2y = 13$

Answer: $x = 3, y = 2$

(e) $7x + 2y = 20$ and $3x - 5y = -9$

Answer: $x = 2, y = 3$

(f) $2x - 5y = -4$ and $3x + 2y = 13$

Answer: $x = 3, y = 2$

6 Solve the simultaneous equations.

$$x + y = 10$$

$$3x + y = 22$$

Answer: $x = 6, y = 4$

7 Solve the simultaneous equations

$$4x + 3y = 18$$

$$x + 3y = 9$$

Answer: $x = 3, y = 2$

8 Rearrange each pair into the form $ax + by = c$, then solve.

(a) $2x = 13 - y$ and $x + 3y = 14$

Answer: $x = 5, y = 3$

(b) $y = 8 - x$ and $3x - y = 4$

Answer: $x = 3, y = 5$

(c) $2x + 3y = 19$ and $x = y + 2$

Answer: $x = 5, y = 3$

(d) $3x = 11 - y$ and $x + 2y = 7$

Answer: $x = 3, y = 2$

- 9 Maya has the equations $4x + 3y = 18$ and $x + 3y = 9$. She adds them but both letters are still there. Explain why adding does not help, and solve the equations correctly.

Answer: Same signs, so subtract: $x = 3, y = 2$

- 10 Explain why the simultaneous equations $x + y = 5$ and $x + y = 7$ have no solution.

Answer: Subtracting gives $0 = 2$, which is impossible

- 11 Solve the simultaneous equations and then write down the value of $x + y$.

$$3x + 5y = 21$$

$$2x + 5y = 19$$

Answer: $x = 2, y = 3$

- 12 Solve each pair, including the negative or fractional answers.

(a) $2x + 3y = -1$ and $3x + 2y = 1$

Answer: $x = 1, y = -1$

(b) $4x - 5y = 2$ and $3x + 2y = 13$

Answer: $x = 3, y = 2$

(c) $2x + 4y = 5$ and $6x - 4y = 3$

Answer: $x = 1, y = \frac{3}{4}$

(d) $5x + 2y = 1$ and $3x + 4y = -5$

Answer: $x = 1, y = -2$

- 13 Solve the simultaneous equations

$$3x + 4y = 2$$

$$5x - 2y = 12$$

Answer: $x = 2, y = -1$

- 14 $x + y = 10$ and $x - y = 2$. Without finding x or y first, show that $x^2 - y^2 = 20$. Then check by solving the equations.

Answer: $x^2 - y^2 = (x - y)(x + y) = 2 \times 10 = 20$