

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

GCSE Maths - Quadratic and Simultaneous Equations - Higher - Lesson 14.6

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-substitution/

Exercise 14F Simultaneous equations: substitution Non-calculator

1 Solve by substitution. One letter is already the subject.

(a) $y = x + 3$ and $x + y = 11$

Answer: $x = 4, y = 7$

(b) $y = 2x$ and $3x + y = 15$

Answer: $x = 3, y = 6$

(c) $y = x - 2$ and $2x + y = 10$

Answer: $x = 4, y = 2$

(d) $y = 3x - 1$ and $x + y = 7$

Answer: $x = 2, y = 5$

(e) $x = y + 4$ and $x + 2y = 10$

Answer: $x = 6, y = 2$

(f) $x = 2y$ and $x + y = 9$

Answer: $x = 6, y = 3$

2 Solve by substitution. Remember the brackets.

(a) $y = 2x + 1$ and $3x + 2y = 16$

Answer: $x = 2, y = 5$

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

Answer: $x = 3, y = 7$

(c) $x = y - 1$ and $3x + 2y = 7$

Answer: $x = 1, y = 2$

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

Answer: $x = 3, y = 2$

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

Answer: $x = 2, y = 1$

(f) $x = 7 - 2y$ and $3x - y = 7$

Answer: $x = 3, y = 2$

3 Rearrange one of the equations, then solve by substitution.

(a) $x + y = 8$ and $2x - y = 4$

Answer: $x = 4, y = 4$

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

Answer: $x = 2, y = 3$

(c) $3x + y = 10$ and $x - 2y = -6$

Answer: $x = 2, y = 4$

(d) $x - y = 3$ and $2x + 3y = 16$

Answer: $x = 5, y = 2$

4 Solve the simultaneous equations

$$x + y = 12$$

$$3x + y = 20$$

Answer: $x = 4, y = 8$

5 Solve the simultaneous equations

$$2x - y = 1$$

$$x + y = 8$$

Answer: $x = 3, y = 5$

6 Explain which method (substitution or elimination) looks easier for $y = x + 7$ and $2x + y = 13$. Then solve the equations.

Answer: Substitution (equation (1) gives y directly): $x = 2, y = 9$

7 Tom is solving $y = 2x - 1$ and $4x - 3y = 7$. He writes " $4x - 3 \times 2x - 1 = 7$ ". Explain his mistake, then solve the equations correctly.

Answer: Missing brackets; $x = -2, y = -5$

8 Solve by substitution, and then check your answer using elimination.

$$3x + 2y = 12$$

$$x + y = 5$$

Answer: $x = 2, y = 3$

9 Solve by substitution.

(a) $y = 2x - 1$ and $4x + 3y = 7$

Answer: $x = 1, y = 1$

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

Answer: $x = 1, y = 2$

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

Answer: $x = 3, y = -1$

10 Solve by substitution.

(a) $5x + 2y = 1$ and $3x + y = 0$

Answer: $x = -1, y = 3$

(b) $4x - 3y = 9$ and $x + 2y = 5$

Answer: $x = 3, y = 1$

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

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

11 The lines $y = 2x + 1$ and $y = ax - 5$ cross at the point where $x = 3$. Find the value of a .

Answer: $a = 4$