

Simultaneous Equations

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Solve: $x + y = 7$ and $x - y = 3$ (elimination)

Step 1 · Label the equations (1) and (2). Add them to eliminate y

$$(1)+(2): 2x = 10 \rightarrow x = 5$$

Step 2 · Substitute $x = 5$ into equation (1)

$$5 + y = 7 \rightarrow y = 2$$

Answer: $x = 5, y = 2$

Check: Check in (2): $5 - 2 = 3$ ✓

2. Now try one with the steps

Solve: $2x + y = 10$ and $x + y = 6$ (elimination)

Step 1 · Subtract equation (2) from equation (1) to eliminate y

Step 2 · Substitute $x = 4$ into equation (2)

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Solve: $x + y = 10$ and $x - y = 4$ [3]

2. Solve: $2x + y = 11$ and $x + y = 7$ [3]

3. Solve: $3x + y = 14$ and $x + y = 6$ (elimination) [3]

4. Solve: $x + 2y = 8$ and $2x + 3y = 13$ [4]

5. Two numbers sum to 20 and differ by 6. Find both numbers. [3]

6. Adult tickets cost £8 and child tickets cost £5. A group bought 10 tickets for £62 altogether. How many of each type did they buy? [4]

7. Solve: $x + y = 9$ and $x - y = 1$ [3]

8. Solve: $x + 3y = 11$ and $x + y = 5$ [3]

9. Solve: $4x + y = 18$ and $2x + y = 10$ [3]

10. Solve: $y = 2x$ and $x + y = 12$ [3]

11. Solve: $3x + 2y = 19$ and $x - 2y = 1$ [3]

12. The sum of two numbers is 25 and their difference is 9. Find the larger number. [3]

13. Two pens and a ruler cost £3.10. One pen and a ruler cost £1.90. How much is one pen? [3]

14. Solve: $2x + 3y = 12$ and $3x + 2y = 13$ [4]

15. Solve: $5x - 2y = 4$ and $3x + 4y = 18$ [4]

16. Find the point where the lines $y = x + 3$ and $y = 3x - 1$ cross.

[3]

4. Before you hand it in

Forgetting to substitute back and only finding x

After finding x (or y) by elimination, always substitute back into one of the original equations to find the other variable.

Adding equations instead of subtracting when the coefficients have the same sign

If both equations have $+2y$ and $+3y$ (same sign), subtract. If one has $+3y$ and the other $-3y$ (opposite signs), add.

Not checking the solution in BOTH original equations

Substitute x and y into both equations. If either one fails, there is an error somewhere in the working.