# Simultaneous Equations

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

## 1. Worked example

**Solve x + y = 8 and 2x − y = 7.**

Step 1 · +y and −y: opposite signs, so add

$3x = 15 \rightarrow x = 5$

Step 2 · Substitute into x + y = 8

$5 + y = 8 \rightarrow y = 3$

**Answer: x = 5, y = 3**

Check: 5 + 3 = 8 ✓ and 10 − 3 = 7 ✓

## 2. Now try one with the steps

**Solve 3x + 2y = 19 and 5x + 4y = 33.**

Step 1 · Double the first equation to match 4y

Step 2 · Same signs: subtract the second equation

Step 3 · Substitute

**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 $3x + 2y = 16$ and $x - 2y = 0$. [3]

**4.** Solve $y = 2x$ and $x + y = 9$. [3]

**5.** Solve $4x + y = 14$ and $2x + y = 8$. [3]

**6.** Solve $2x + 3y = 12$ and $5x + 3y = 21$. [3]

**7.** Solve $4x - 3y = 1$ and $2x + y = 13$. [4]

**8.** Solve $3x + 4y = 10$ and $2x + 3y = 7$. [4]

**9.** Solve $5x - 2y = 4$ and $3x + 5y = 21$. [4]

**10.** The lines $y = x + 1$ and $y = 7 - 2x$ are drawn on a grid. Where do they cross? [2]

**11.** Two numbers add up to 23 and have a difference of 7. Find them. [3]

**12.** 3 pens and 2 pencils cost £1.90. 1 pen and 4 pencils cost £1.30. Find the cost of a pen, in pence. [4]

**13.** 2 adult and 3 child cinema tickets cost £38. 1 adult and 2 child tickets cost £22. Find the price of an adult ticket, in £. [4]

**14.** Explain why $x + 2y = 5$ and $2x + 4y = 8$ have no solution. [2]

**15.** The line $y = mx + c$ passes through (1, 4) and (3, 10). Use simultaneous equations to find m and c. [3]

## 4. Before you hand it in

**Adding 2x + y = 11 and x + y = 7 to 'eliminate' y**

Both y terms are +y (same signs), so SUBTRACT: x = 4. Add only when the signs are opposite.

**Multiplying only the x term when scaling an equation: 3x + 2y = 19 → 6x + 2y = 38**

Multiply EVERY term, including the right-hand side: 6x + 4y = 38.

**Stopping at x = 5**

Substitute back to find y, and give both values.

**Subtracting –3y from 12y as 9y**

12y – (–3y) = 15y. If the signs are opposite, adding is safer.