Simultaneous equations: fact sheet

Planner week 17 · Learn these facts

What it means

two equations

two unknowns

one answer for each

Find x and y that work in both

Same number

$x + 3y = 12$

$5x - y = 4 \quad (\times 3)$

$15x - 3y = 12$

Make one letter match

Multiply a whole equation

Add or subtract

same signs: subtract

different signs: add

"SSS": same signs subtract

Solve

$16x = 24$

$x = 1.5$

One letter is left

Substitute back

$1.5 + 3y = 12$

$y = 3.5$

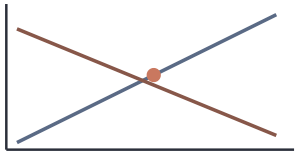
Put x into either equation

Check

$5 \times 1.5 - 3.5 = 4$ ✓

Use the other equation

Using graphs



The answer is where the lines **cross**

Write x = ..., y = ...

Answers

Give	x = ... and y = ...
Check	in both equations

Key words

- **Simultaneous** both true at the same time
- **Eliminate** get rid of one letter
- **Substitute** put a value back in
- **Intersection** where two lines cross

Exam tips

- Line the equations up: x under x, y under y.
- Multiply to make one letter's numbers the same.
- Same signs subtract, different signs add.
- Watch the negatives when you subtract.
- Substitute back to find the other letter.
- Check in the equation you didn't use.

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Simultaneous equations · Planner week 17 · Learn the method

Worked example

QUESTION

Solve the simultaneous equations

$x + 3y = 12 \quad 5x - y = 4$

ANSWER

1. Multiply the second equation by 3: $15x - 3y = 12$
2. Add the two equations: $16x = 24$, so $x = 1.5$
3. Put $x = 1.5$ in the first: $1.5 + 3y = 12$, so $3y = 10.5$

$x = 1.5, y = 3.5$

Match one letter, add or subtract, then substitute back.

How to do it

1. Label the equations (1) and (2).
2. Multiply so one letter has the same number in both.
3. Add or subtract to get rid of that letter.
4. Solve for the other letter.
5. Substitute back, then check.

Model answer:

$x = 1.5, y = 3.5$

Watch out

- Multiplying only one term, not the whole equation.
- Subtracting when the signs are different.
- Stopping after finding x.