Name	Date started	Target end date

WJEC GCSE Mathematics and Numeracy (Double Award) — Question Pack

Solving pairs of linear simultaneous equations by elimination and substitution, and interpreting solutions graphically as the intersection of two line

REVISE
.wales

3.02 — Simultaneous equations — algebraic & graphical

Spec 2.2.6, 2.4.7 — Unit 2 (no calculator)

Solving pairs of linear simultaneous equations by elimination and substitution, and interpreting solutions graphically as the intersection of two lines. Sourced from legacy WJEC GCSE Mathematics Higher calculator-allowed papers, organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~44 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (29 marks across 7 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. Questions are organised against the 2025 specification. Questions are ordered chronologically by sitting, with custom-written and SAM questions at the end.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working — method marks are awarded for clear setup.

*A calculator is **not** permitted on any question in this pack (Unit 2 is the non-calculator paper).*

Simultaneous equations — algebraic & graphical — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 2: non-calculator.

Elimination 2.2.6

- Scale equations so a variable's coefficients match in magnitude.
- Add (opposite signs) or subtract (same signs) to eliminate that variable.
- Solve the remaining one-variable equation, then back-substitute.

Substitution 2.2.6

- Rearrange one equation to make a variable the subject.
- Substitute into the other equation and solve.
- Best when an equation is already $y = \ldots$ or $x = \ldots$.

Graphical interpretation 2.4.7

- Plot both lines — intersection (x, y) is the solution.
- Parallel lines: no solution; identical lines: infinitely many.
- Useful as a sanity check on an algebraic answer.

Modelling with simultaneous equations 2.2.6

- Define two unknowns clearly.
- Write one equation per independent piece of information.
- Answer the question asked — not just x and y.

Crib sheet »

Simultaneous equations — algebraic & graphical in one page

Quick-reference notes — revisit before each question. Don't use during the questions.

Elimination method

Multiply one or both equations so a variable's coefficients *match* (same sign for subtraction, opposite for addition).

Add or subtract to eliminate that variable.

Solve the resulting one-variable equation, then back-substitute.

Substitution method

Rearrange one equation to make x or y the subject.

Substitute into the other equation.

Useful when one equation already has $y = \ldots$ or $x = \ldots$ form.

Graphical method

Plot both lines on the same axes.

The intersection point (x, y) is the simultaneous solution.

Parallel lines ⇒ no solution; identical lines ⇒ infinitely many.

Worked example (elimination)

$3x + 4y = 7$
$2x - 3y = 16$

Multiply: $9x + 12y = 21$ and $8x - 12y = 64$.

Add: $17x = 85 \Rightarrow x = 5$.

Back-sub: $3(5) + 4y = 7 \Rightarrow y = -2$.

Word problems

Pick two unknowns (e.g. cost of adult ticket, cost of child ticket).

Write one equation per piece of information.

Solve the system, then answer the actual question (often a total or difference).

Check your answer

Substitute the (x, y) pair back into *both* original equations.

If both balance, your solution is correct.

Quick sanity check — especially when working with decimals or negatives.

When to use which

Elimination: best when coefficients line up nicely (or scale by small factors).

Substitution: best when one equation is already $y = \ldots$ or has a coefficient of 1.

Either works — pick whichever is faster on the day.

Common traps

- Subtracting when you should add (mismatched signs on the matched coefficient).
- Distributing the multiplier across only one term of the equation.
- Forgetting to back-substitute to find the second variable.
- Mis-reading the question and answering only the first variable.

Examiner only

8. Solve the following simultaneous equations using an algebraic (not graphical) method. [4]

$$3x + 4y = 7$$
$$2x - 3y = 16$$

Examiner only

9. Solve the following simultaneous equations using an algebraic (not graphical) method. [4]

$$4x - 3y = 2$$
$$6x - 5y = 1$$

Examiner only

7. The Morgan family and the Smith family are on holiday in Aberystwyth.
There are 7 adults and 2 children in the Morgan family.
There are 4 adults and 3 children in the Smith family.

Both families visit a Craft Centre.
The entry price to the Craft Centre is £x for adults and £y for children.

The total cost for the Morgan family is £41.50.
The total cost for the Smith family is £29.75.

Form two equations in terms of x and y.

Solve your equations, using an algebraic method, to find the entry price for adults and the entry price for children. [5]

The adult entry price (£x) = £ ..... The child entry price (£y) = £ .....

Examiner only

6. Solve the following simultaneous equations using an algebraic (not graphical) method.

$$5x + 3y = 11$$
$$2x - 7y = 29$$

You must show all your working. [4]

Examiner only

9. Solve the following simultaneous equations using an algebraic (not graphical) method.

$$3x - 2y = 14$$
$$7x + 3y = 25$$

You **must** show all your working. [4]

Examiner only

6. Solve the following simultaneous equations using an algebraic (not graphical) method. You must show all your working. [4]

$$2x + 3y = 29$$
$$5x - 4y = -8$$

Examiner only

5. Solve the following simultaneous equations using an algebraic (not graphical) method. You must show all your working. [4]

$$2x + 3y = 16{\cdot}4$$

$$3x - 2y = 7{\cdot}7$$