Name	Date started	Target end date

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

Foundation drawing quadratic graphs: substituting x values into $y = ax^2 + bx + c$ to complete a table, plotting the points on a labelled gri

REVISE
.wales

F2.13 — Drawing quadratic graphs ($y = ax^2 + bx + c$)

Spec 2.4.4 — Unit 2 (no calculator)

Foundation drawing quadratic graphs: substituting x values into $y = ax^2 + bx + c$ to complete a table, plotting the points on a labelled grid, and joining them with a smooth symmetric U-shaped curve (or upside-down U when a is negative). Sourced from legacy WJEC GCSE Mathematics-Numeracy Foundation papers (3300U10/U20) and accessible content from Intermediate papers (3300U30/U40), organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~33 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (22 marks across 6 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).*

Drawing quadratic graphs ($y = ax^2 + bx + c$) — what the new spec asks

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

Tables of values 2.4.4

- Substitute a list of x values into $y = ax^2 + bx + c$.
- Handle negative x values correctly (use brackets).
- Check the table is symmetric about the turning point.

Plotting and curve 2.4.4

- Plot all points from the table accurately.
- Join with a smooth curve, not straight segments.
- Recognise U-shape vs ∩-shape from the sign of a.

Reading the graph 2.4.4

- Identify the minimum (or maximum) point from the curve.
- Read solutions of $y = 0$ from where the curve crosses the x-axis.
- Read y for a given x or x for a given y.

Exam strategy 2.4

- Non-calculator — show the substitution working.
- Plot points lightly first, then draw the curve in pen.
- Label the axes and any required points (minimum, intercepts).

Crib sheet »

Drawing quadratic graphs ($y = ax^2 + bx + c$) in one page

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

Quadratic form

$$y = ax^2 + bx + c$$

The squared term gives the curve. a, b, c are numbers ($a \neq 0$).

Substituting values

Substitute each x value into the formula. Use brackets around negatives so the square is positive.

$x = -3 \Rightarrow (-3)^2 = 9$.

U-shape and ∩-shape

$a > 0 \Rightarrow$ U-shape (smiles).

$a < 0 \Rightarrow$ ∩-shape (frowns).

Symmetry

A quadratic graph is symmetrical about a vertical line through its lowest (or highest) point.

Drawing the curve

Plot every point from the table, then draw a *smooth* curve through all of them — not straight segments.

Common traps

- Forgetting brackets when squaring a negative x.
- Drawing straight-line segments between points.
- Missing the symmetry / minimum point.

Examiner only

9. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

In the diagram below,

- *ABCD* is a rectangle, and
- *PQ* is parallel to *AD*.

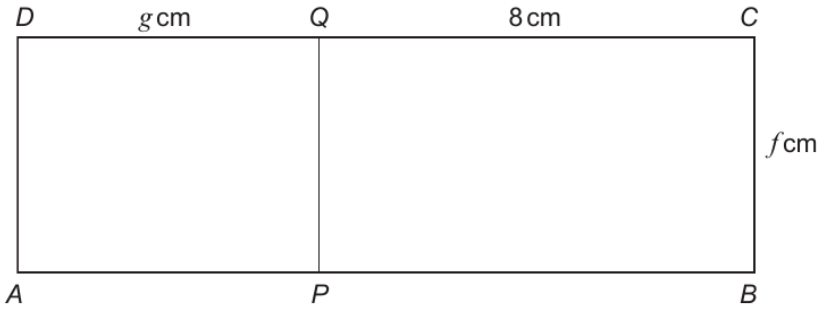

Diagram not drawn to scale

The area of *ABCD* is 52 cm^2.
The area of *APQD* is 20 cm^2.

Calculate the values of f and g.
You must show all your working. [5 + 2 OCW]

3300U301
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Examiner only

12. The table below shows some of the values of $y = x^2 + 4x - 1$ for values of x from –5 to 2.

x	–5	–4	–3	–2	–1	0	1	2
$y = x^2 + 4x - 1$	4	–1	–4		–4	–1	4	

(a) Complete the table by finding the value of y for $x = -2$ and for $x = 2$. [2]

.....

.....

.....

(b) On the graph paper opposite, draw the graph of $y = x^2 + 4x - 1$ for values of x from –5 to 2. [2]

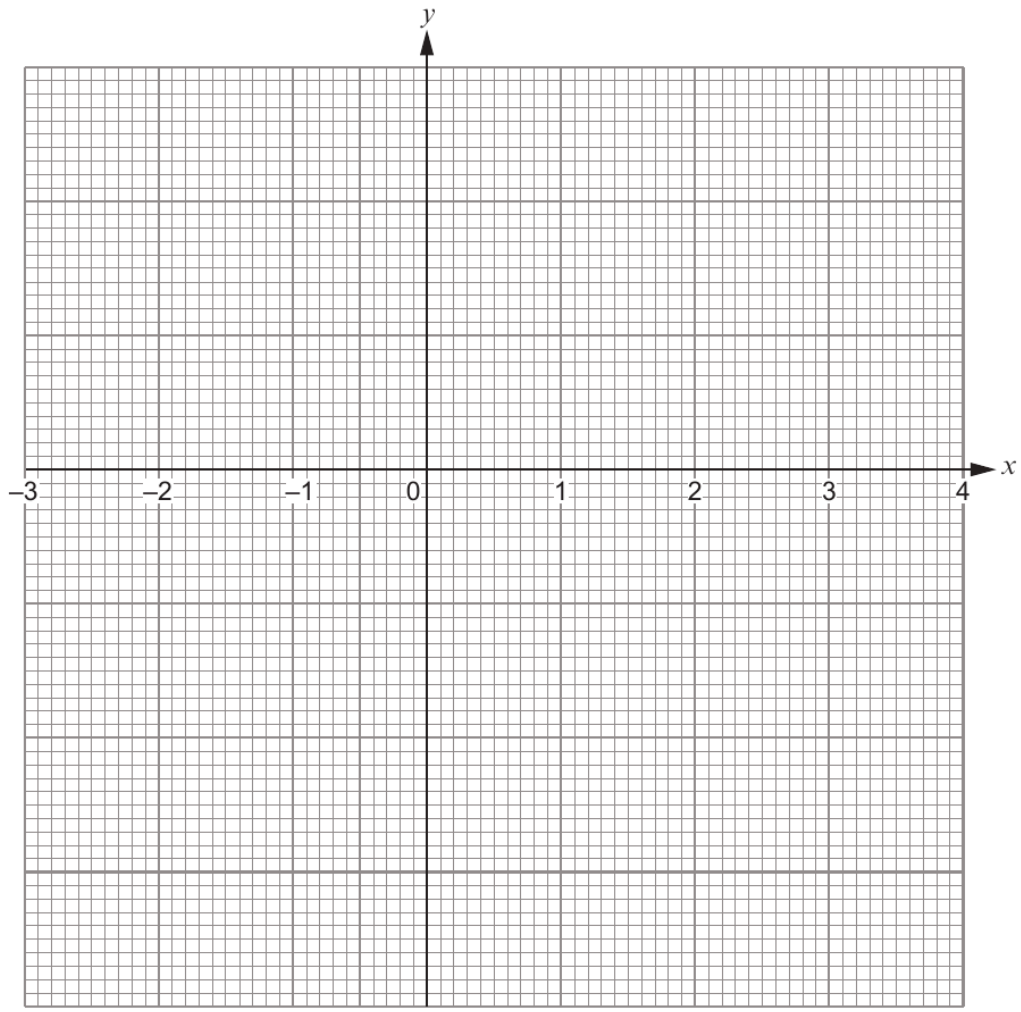
(c) Draw the line $y = 2$ on the graph paper.
Write down the values of x where the line $y = 2$ cuts the curve $y = x^2 + 4x - 1$. [2]

Values of x are ..... and .....

Examiner only

11. Complete the table below.
Draw the graph of $y = 3x^2 - 25$ for values of x between −3 and 4.
Use the graph paper below.
You must choose a suitable scale for the y-axis. [4]

x	–3	–2	–1	0	1	2	3	4
$y = 3x^2 - 25$	2		–22	–25	–22	–13	2	23



Examiner only

12. The table below shows some of the values of $y = x^2 - 2x - 4$ for values of x from –3 to 4.

x	−3	−2	−1	0	1	2	3	4
$y = x^2 - 2x - 4$	11	4	−1	−4		−4	–1	4

(a) Complete the table by finding the value of y when $x = 1$. [1]

.....

.....

(b) On the graph paper opposite, draw the graph of $y = x^2 - 2x - 4$ for values of x from –3 to 4. [2]

(c) (i) Draw the line $y + x = 4$ on the graph paper. [2]

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.....

(ii) Write down the values of x where the line $y + x = 4$ cuts the curve $y = x^2 - 2x - 4$. [1]

Values of x are ..... and .....

Examiner only

14. The table below shows some of the values of $y = x^2 - 4x - 3$ for values of x from –2 to 5.

x	−2	–1	0	1	2	3	4	5
$y = x^2 - 4x - 3$		2	−3	−6		−6	−3	2

(a) Complete the table by finding the value of y for $x = -2$ and the value of y for $x = 2$. [2]

(b) On the graph paper opposite, draw the graph of $y = x^2 - 4x - 3$ for values of x from –2 to 5. [2]

(c) Draw the line $y = 1$ on the graph paper.
Write down the values of x where the line $y = 1$ cuts the curve $y = x^2 - 4x - 3$. [2]

Values of x are ..... and .....

Examiner only

11. (a) Evaluate $\sqrt{0{\cdot}9^3 - 0{\cdot}9^4}$. [2]

(b) What is the greatest integer value of n if $2n < 17$? [1]

Greatest integer value of n = ...

(c) What is the least integer value of n if $2^n > 125$? [1]

Least integer value of n = ...