Name	Date started	Target end date

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

Drawing and interpreting quadratic graphs $y = ax^2 + bx + c$ on the non-calculator paper: completing tables of values, plotting the parabola, and dra

REVISE
.wales

2.26 — Drawing quadratic graphs

Spec 2.4.4 — Unit 2 (no calculator)

Drawing and interpreting quadratic graphs $y = ax^2 + bx + c$ on the non-calculator paper: completing tables of values, plotting the parabola, and drawing the horizontal line $y = k$ to solve $ax^2 + bx + c = k$. Sourced from legacy WJEC GCSE Mathematics Higher non-calculator papers, organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~1 hours 21 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (54 marks across 13 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 — what the new spec asks

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

Plotting $y = ax^2 + bx + c$ 2.4.4

- Compute y for each tabulated x — careful with signs and powers.
- Plot every point, then draw a smooth curve.
- Use the grid scale stated on the axes.

Reading values from the graph 2.4.4

- Roots are x-coordinates where the curve meets the x-axis.
- Turning point: x-coordinate of the minimum or maximum.
- Read to the precision the grid supports (usually 1 d.p.).

Solving $f(x) = k$ on your graph 2.4.4

- Draw the horizontal line $y = k$ on the same axes.
- x-coordinates of intersections are the solutions.
- Two intersections → two solutions; one → repeated; none → no real solution.

Smooth-curve discipline 2.4.4

- Always join the plotted points with a smooth, free-hand curve.
- Never use a ruler between points on a parabola.
- Plot enough points so the shape is clear, especially near the vertex.

Crib sheet »

Drawing quadratic graphs in one page

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

Shape of a parabola

$y = ax^2 + bx + c$ is a ∪-shape (opens up) if $a > 0$.

It is a ∩-shape (opens down) if $a < 0$.

The graph has one turning point — minimum or maximum.

Completing the table

Substitute each x value into the formula, one at a time.

$x = -2$ in $y = 2x^2 - 5x - 1$: $2(4) - 5(-2) - 1 = 8 + 10 - 1 = 17$.

Sign slips are the most common error — double-check negatives.

Drawing the curve

Plot every point from your table carefully.

Join with a smooth curve — never ruled segments.

The curve should pass through every plotted point.

Choosing a scale

When the question asks you to choose a scale: read the range of y-values from your table.

Pick a scale that fits all your points without compressing detail.

Label axes clearly with values.

Drawing $y = k$

To solve $ax^2 + bx + c = k$ graphically, draw the horizontal line $y = k$.

Read off the x-coordinates where the line cuts the curve.

Two intersections give two solutions.

Worked example

Curve $y = x^2 - 4x - 3$; draw line $y = 1$.

Same as solving $x^2 - 4x - 3 = 1$, i.e. $x^2 - 4x - 4 = 0$.

Read the two crossings off the grid — e.g. $x \approx -0.8$ or $x \approx 4.8$.

Choosing axis spacing

Most papers give the grid; otherwise use 1–2 small squares per integer.

Make sure your highest and lowest y-values fit on the grid.

Don't cram everything into a corner — use the full area.

Common traps

- Joining points with a ruler instead of a smooth curve.
- Sign slip in the table for negative x values.
- Reading intersection x-values to the nearest whole number when 1 d.p. is asked.
- Plotting (x, y) in the wrong order.

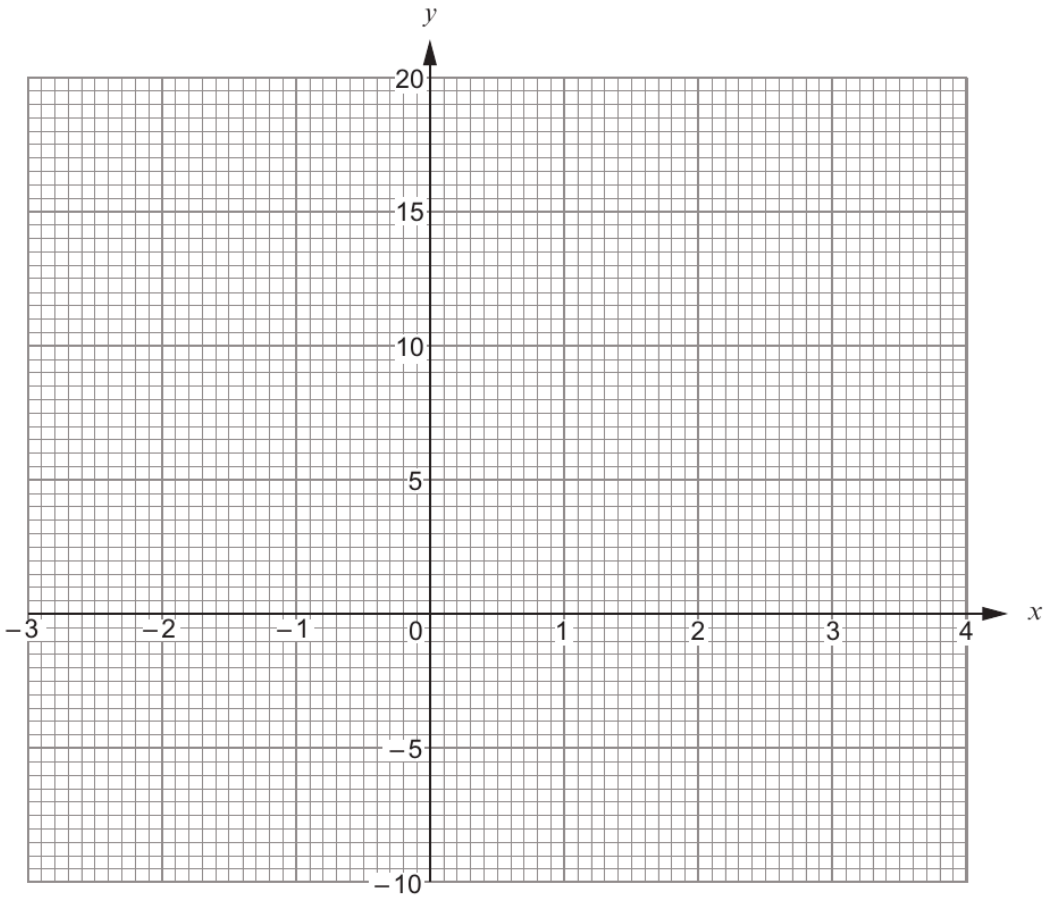
Examiner only

2. *(a)* The table below shows some of the values of $y = 2x^2 - 5x - 1$ for values of x from –2 to 4.

Complete the table by finding the value of y for $x = -1$ and for $x = 2$. [2]

x	−2	−1	0	1	2	3	4
$y = 2x^2 - 5x - 1$	17		−1	−4		2	11

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



Examiner only

(c) Draw the line $y = 5$ on the graph paper.

Write down the values of x where the line $y = 5$ cuts the curve $y = 2x^2 - 5x - 1$.
Give your answers correct to 1 decimal place. [2]

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

(d) Circle the equation below whose solutions are the values you have given in *(c)*. [1]

$2x^2 - 5x - 1 = 0$ $2x^2 - 5x - 6 = 0$ $2x^2 - 5x - 5 = 0$

$2x^2 - x - 1 = 0$ $2x^2 - 5x + 4 = 0$

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Examiner only

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

x	-1	0	1	2	3	4	5
$y = x^2 - 5x + 2$	8	2	-2	-4		-2	2

(a) Complete the table above. [1]

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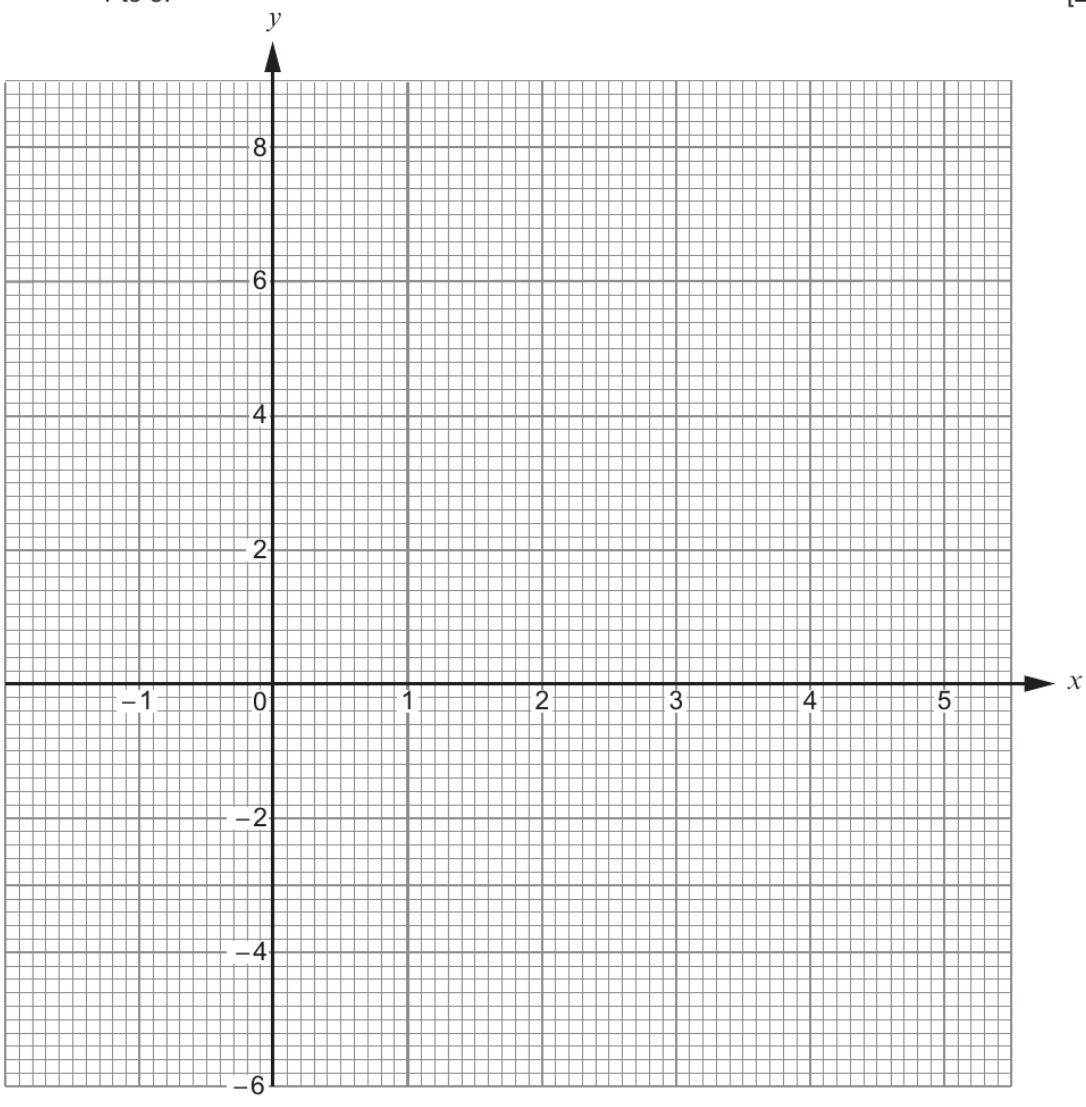
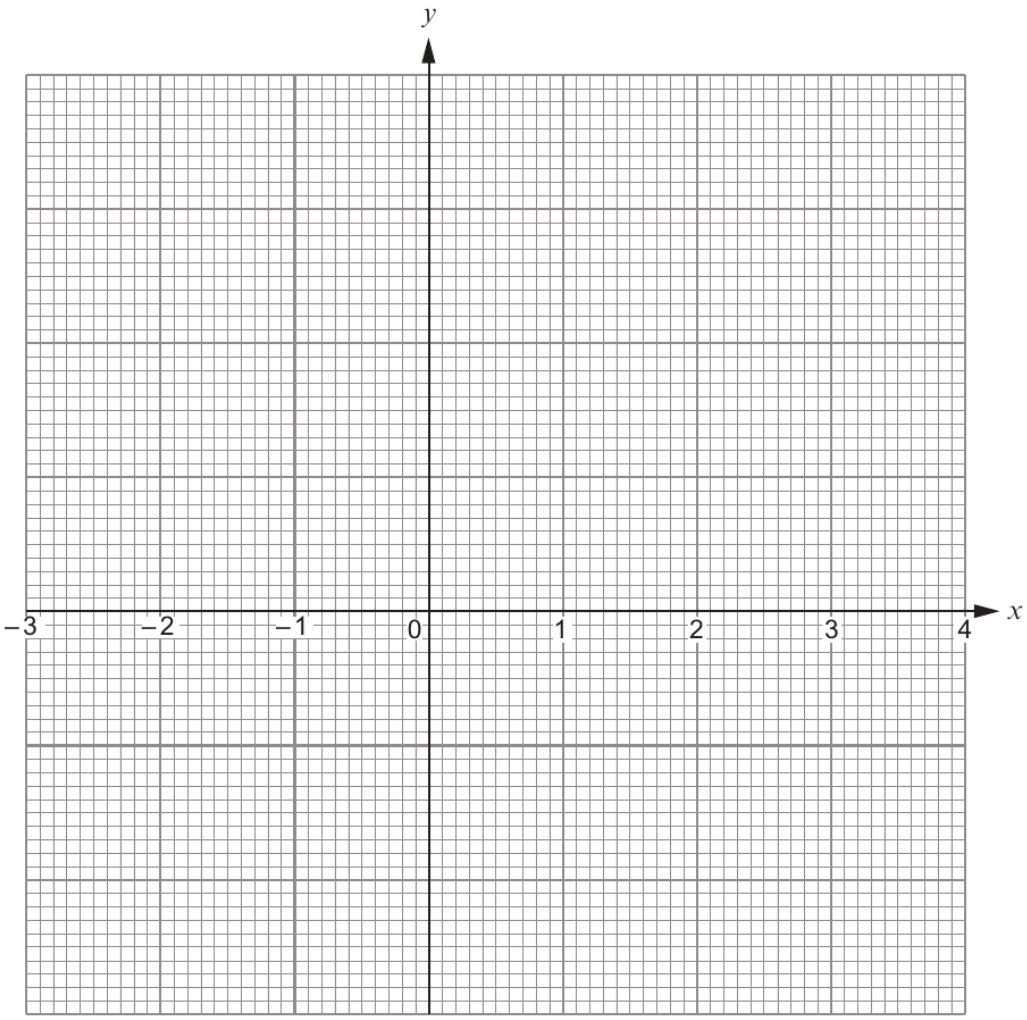
(b) On the graph paper below, draw the graph of $y = x^2 - 5x + 2$ for values of x from -1 to 5. [2]



Examiner only

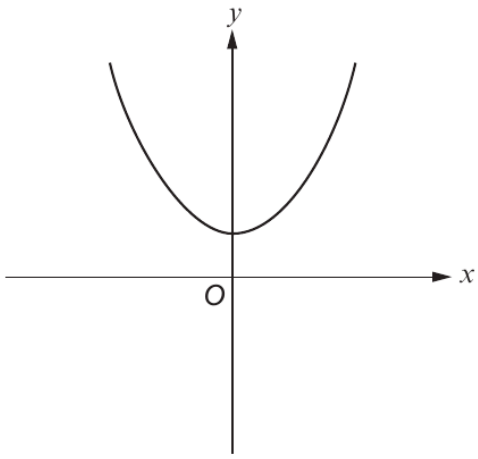
2. *(a)* Complete the table below.
Draw the graph of $y = 2x^2 - 5$ for values of x between –2 and 3.
Use the graph paper below.
Choose a suitable scale for the y-axis. [4]

x	–2	–1	0	1	2	3
$y = 2x^2 - 5$	3		–5	–3	3	13



Examiner only

(b)



The sketch above can represent only one of the equations given below.
Circle this equation. [1]

$y = x^2$ $y = x^2 - 3$ $y = -x^2$ $y = x^2 + 3$ $y = 3x$

Examiner only

3. 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]

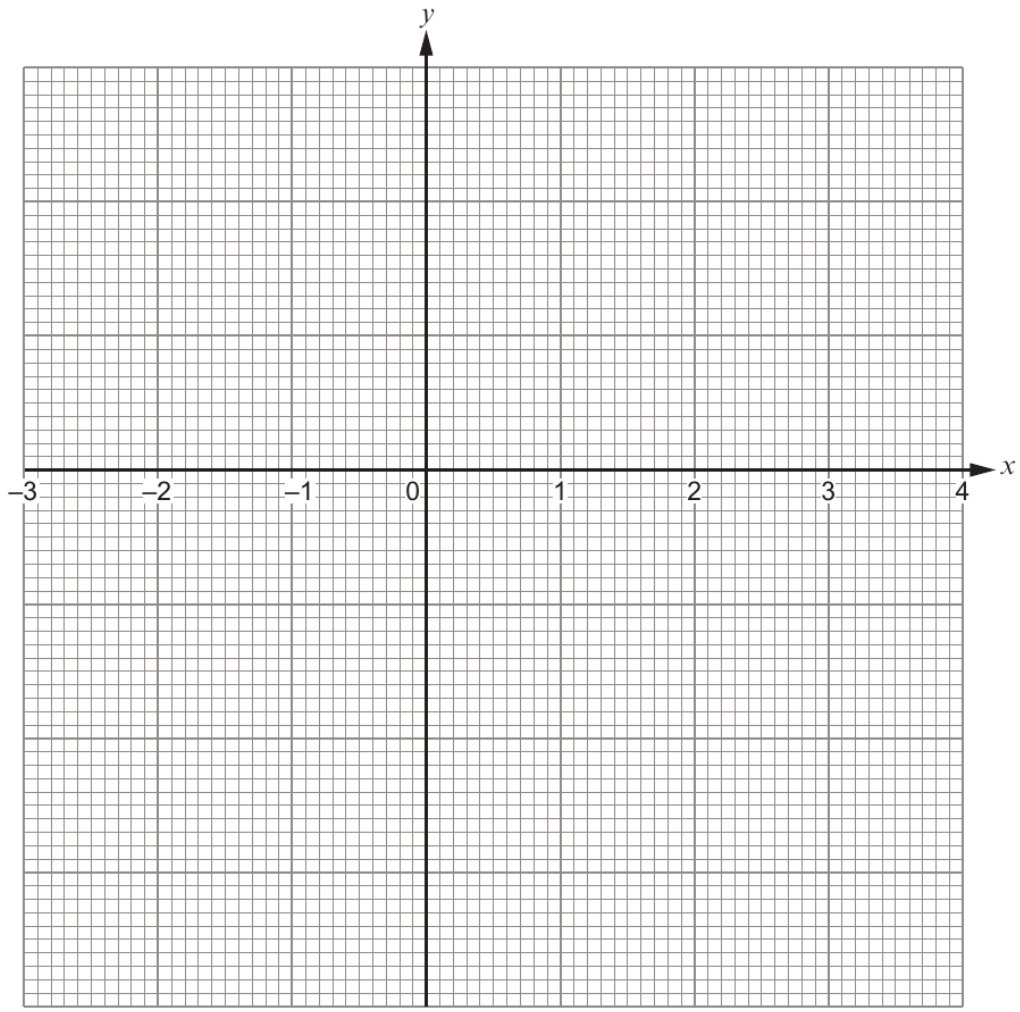
(c) Draw the line $y = 2$ on the graph paper.
Write down the values of x where the line $y = 2$ cuts the curve $y = x^2 + 4x - 1$. [2]

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

Examiner only

2. 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

3. 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]

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.....

(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

3. 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]

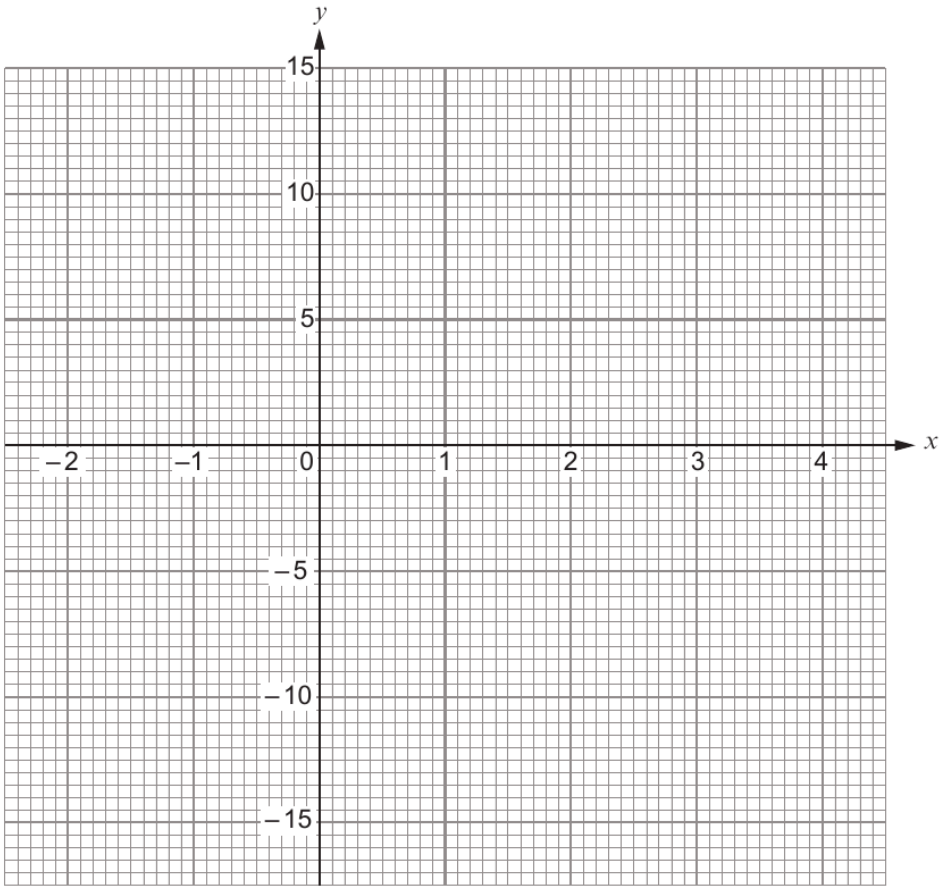
(c) Draw the line $y = 1$ on the graph paper.
Write down the values of x where the line $y = 1$ cuts the curve $y = x^2 - 4x - 3$. [2]

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

Examiner only

3. Complete the table below.
Draw the graph of $y = 7 - x^2$ for values of x between −2 and 4.
Use the graph paper below. [4]

x	−2	−1	0	1	2	3	4
$y = 7 - x^2$	3		7	6	3		−9



Examiner only

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

x	–3	–2	–1	0	1	2	3
$y = x^2 + x - 4$	2	–2		– 4		2	8

(a) Complete the table by finding the values of y for x = –1 and for x = 1. [2]

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

(c) Use your graph to solve the equation $x^2 + x - 4 = 0$.
Give your answers correct to 1 decimal place. [1]

x = ... or x = ...

Examiner only

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

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

(a) Complete the table by finding the value of y for $x = -2$ and for $x = 1$. [2]

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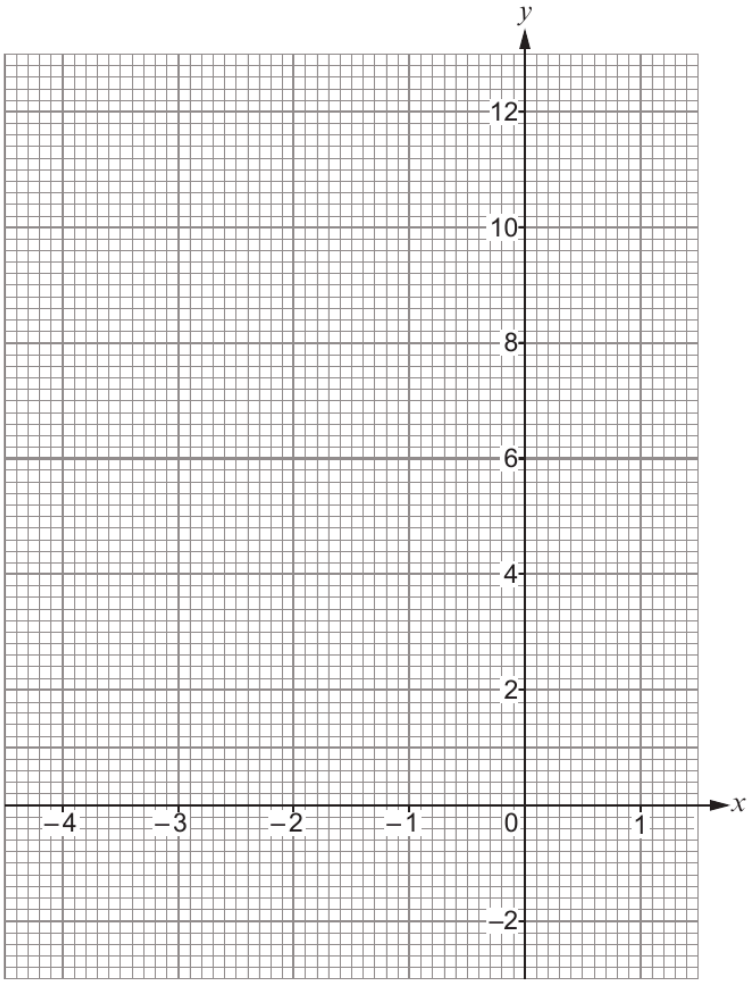
(b) On the graph paper below, draw the graph of $y = x^2 + 4x + 5$ for values of x from –4 to 1. [2]



Examiner only

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

x	-4	-3	-2	-1	0	1	2
$y = 2x^2 + 5x - 3$	9	0	-5	-6	-3		15

(a) Complete the table above. [1]

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

(c) Draw the line $y = 6$ on the graph paper.
Write down the values of x where the line $y = 6$ cuts the curve $y = 2x^2 + 5x - 3$. [2]

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

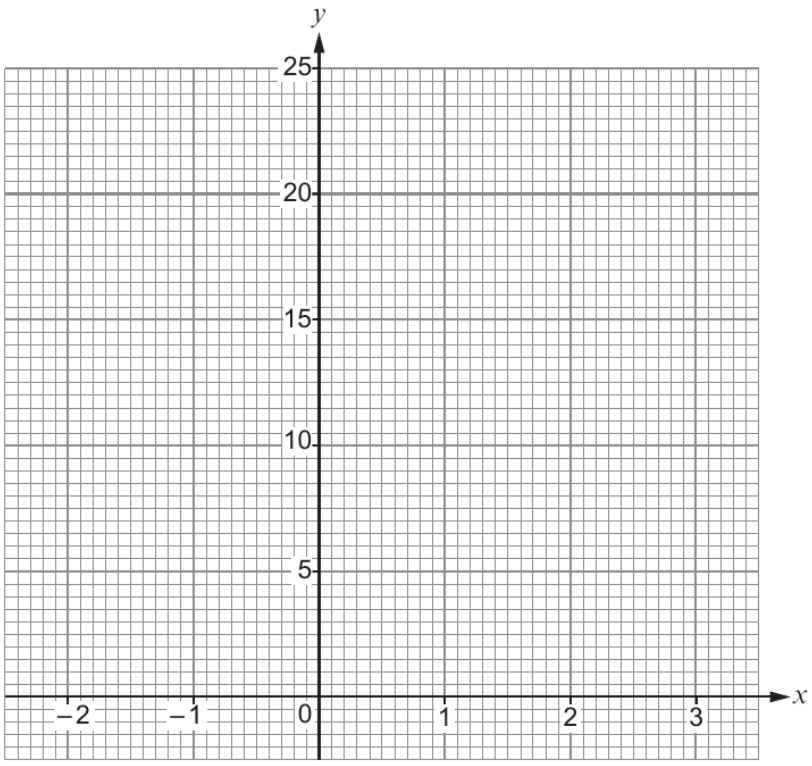
Examiner only

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

x	–2	–1	0	1	2	3
$y = 2x^2 + x + 3$		4	3	6		24

(a) Complete the table by finding the values of y for x = –2 and for x = 2. [2]

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



x						
$y = x^2 - 3x - 2$						