Name	Date started	Target end date

WJEC Level 2 Additional Mathematics — Question Pack

Finding where a curve and a line meet using an algebraic method — substitute, solve the quadratic, find both points.

REVISE
.wales

Intersection of a curve and a line

Coordinate geometry · Level 2 Certificate (9550) · calculator allowed

Finding where a curve and a line meet using an algebraic method — substitute, solve the quadratic, find both points.

LEVEL 2 · 9550

Estimated time for entire question pack: ~58 minutes

*At the Additional Maths pace of **~1.2 min/mark** (48 marks across 9 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. It gathers every question on this topic from the 2011–2024 papers.

Questions are ordered by year, newest first.

INSTRUCTIONS

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

A calculator is allowed throughout this qualification.

Intersection of a curve and a line — what's examined

WJEC Level 2 Additional Mathematics (9550) · single written paper, calculator allowed.

Setting up Coord. geom.

- Substitute the line into the curve.
- Form a single quadratic equation.
- Set it equal to 0.

Solving Algebra

- Factorise or use the formula.
- Each x gives a y from the line.
- State the coordinates of each point.

Interpreting Method

- Two solutions = two crossing points.
- A repeated root = a tangent (touches once).
- Show all algebra.

Crib sheet »

Intersection of a curve and a line in one page

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

The method

Replace y in the curve with the line’s expression, then solve the quadratic in x.

Back-substitute

Put each x back into the **line** (simpler) to get y.

Discriminant clue

$b^2 - 4ac > 0$: two points
$= 0$: tangent · < 0: misses

Present

Give answers as coordinate pairs (x, y).

8. Find, using an algebraic method, the coordinates of the points of intersection of

$$y = \frac{x^2}{2} - 2x + 3 \text{ and } 6y = 4x + 1.$$

Give your answers correct to 2 decimal places.

You must show all your working. [6]

9. Matilda buys $(2w+3)$ apples for £7.

Jac buys $(5w-2)$ oranges for £11.

Rowena buys 2 apples and 1 orange from the same shop.

Write an expression for the total cost, in pounds, of the 2 apples and 1 orange that Rowena buys.

You must simplify your expression to give your answer as a single fraction in terms of w. [5]

8. Find, using an algebraic method, the coordinates of the points of intersection of

$$y = 4x^2 + 2x - 3 \quad \text{and} \quad 10x - 2y + 3 = 0 .$$

You must show all your working. [6]

9. Find the points of intersection of $y = 5x^2 - 8x - 6$ and $y = 10x + 2$. [6]

14. Find, using an algebraic method, the coordinates of the points of intersection of the curve $y = x^2 - 5x + 13$ and the line $y = 2x + 1$.

You must show all your working. [4]

5. Find the coordinates of the points of intersection of the curve $y = 4x^2 + 8x - 3$ and the straight line $y = 3x - 1$.
Use an algebraic method and give your answers correct to 2 decimal places. [6]

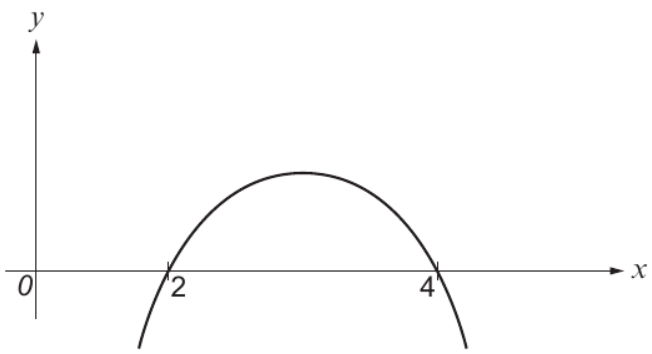
6. The coordinates of the points *F* and *G* are (8, 20) and (–4, 10) respectively.

(a) Calculate the length of the line *FG*.
Express your answer as a surd in its simplest form, $n\sqrt{m}$. [3]

(b) Find the equation of the straight line **perpendicular** to *FG* that passes through the mid-point of *FG*.
Express your answer in the form $ax + by + c = 0$, where a, b and c are integers.
Give your answer in its simplest form. [9]

14. Find, using an algebraic method, the coordinates of the points of intersection of the curve $y = x^2 - 6x + 14$ and the straight line $x + y = 10$.
You must show all your working. [4]

15. Millie has sketched the curve $y = -x^2 + 6x - 8$.



(a) Millie states that the points (2, 0) and (4, 0) lie on the curve $y = -x^2 + 6x - 8$. Show that Millie is correct. [2]

(b) Calculate the area of the region bounded by the curve $y = -x^2 + 6x - 8$ and the x-axis. You must show all your working. [5]

END OF PAPER

6. Find the coordinates of the points of intersection of the curve $y = x^2 + 6x - 5$ and the straight line $y = 2x + 1$.
Use an algebraic method and give your answers correct to 2 decimal places. [6]

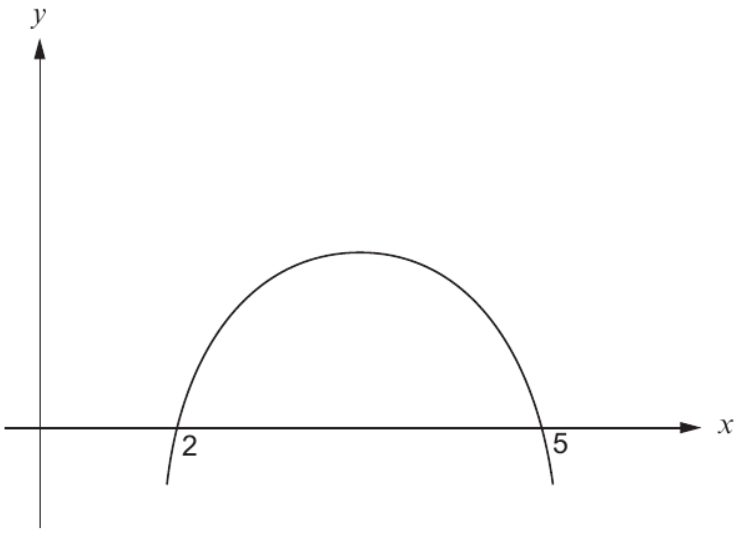
7. *(a)* Find the remainder when $3x^3 - 2x^2 + 5x - 1$ is divided by $x + 2$. [2]

(b) (i) Show that $x - 2$ is a factor of $x^3 + 8x^2 + x - 42$. [2]

(ii) **Hence** factorise $x^3 + 8x^2 + x - 42$. [4]

14. Find the coordinates of the points of intersection of the curve $y = x^2 - 7x + 12$ and the straight line $x + y = 4$. [4]

15. Dan has sketched the curve $y = -x^2 + 7x - 10$.



He has indicated two points on the curve, (2, 0) and (5, 0).

(a) Show that these points lie on this curve. [2]

(b) Showing all your working, calculate the area of the region bounded by the curve $y = -x^2 + 7x - 10$ and the x-axis. [5]

6. Find the coordinates of the points of intersection of the curve with equation $y = x^2 + 2x - 3$ and the straight line with equation $y = x + 1$.
Give your answers correct to 2 decimal places.

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[6]

7. *(a)* Find $\frac{d^2y}{dx^2}$ when $y = 6x^9$.

[2]

(b) Find $\int 3x^4 + \frac{1}{x^3} + 4\,dx$.

[4]

(c) Showing all your working, evaluate $\int_2^3 6x^5 + 5\,dx$.

[5]