

C2.11 Sketching curves

Name: _____ Class: _____ Date: _____ **Total: 20 marks**

KEY WORDS symmetry 对称 • intercept 截距 • quadratic 二次 • roots 根 • linear 一次

Objective

Use sketching curves to solve Core IGCSE Mathematics problems.

You must be able to:

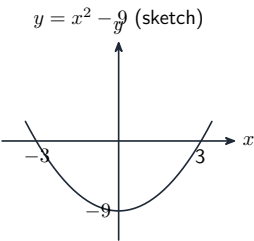
- Recognise and sketch linear and quadratic graphs
- Label roots, intercepts and quadratic symmetry
- Explain the difference between plotting and reading a sketch

1 Key knowledge and worked examples

■ **Key knowledge: Sketching curves**

A sketch shows the shape and important crossings rather than a full table. A linear graph is straight. A positive quadratic opens upwards; a negative quadratic opens downwards. Mark roots where $y = 0$ and the y -intercept where $x = 0$. A quadratic has a vertical line of symmetry halfway between its two roots. Core sketching does not require turning-point coordinates.

■ **Worked example: Sketching curves**



Sketch $y = x^2 - 9$.

- The positive x^2 term makes an upward curve.
- The roots satisfy $x^2 = 9$, so $x = -3, 3$.
- At $x = 0$, $y = -9$; symmetry is $x = 0$.
- Sketch $y = -2x + 4$ as a line through $(0, 4)$ and $(2, 0)$.

■ **Method check**

A quadratic sketch needs its shape, roots and symmetry. Core does not require turning-point coordinates; a sketch is not an accurate scale graph.

2 Practice

2.1 State whether $y = 3x - 1$ is linear or quadratic. [2]

2.2 Find the roots of $y = x^2 - 16$. [2]

2.3 State the opening direction and y -intercept of $y = -x^2 + 9$. [2]

2.4 A quadratic crosses the x -axis at -2 and 6 . Find its line of symmetry. [2]

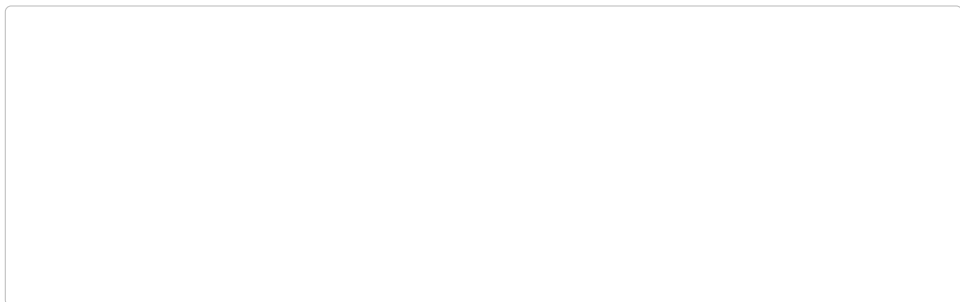
3 Exam-style questions

3.1 Apply the sketching curves methods below. Show working and include units where appropriate.

(a) For $y = 4 - x^2$, find the two roots. [2]

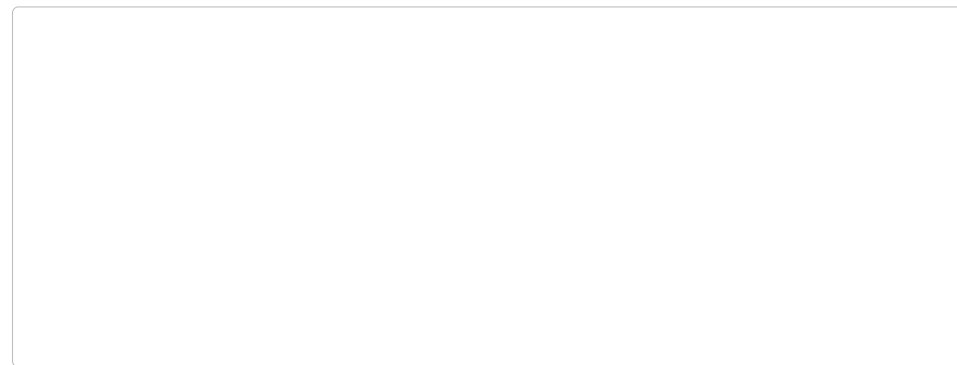
(b) Find the y -intercept and line of symmetry. [2]

(c) Sketch the curve with its crossings labelled. [2]



3.2 Consider $y = x^2 - 9$ and $y = 3x - 6$.

(a) Sketch the quadratic, labelling its roots, y -intercept and line of symmetry. [3]



(b) Find the intercepts of the straight line and sketch it. State which graph has two x -axis crossings and explain why. [3]

