



AS Mathematics Exam Questions by Topic
Chapter 4: Equations and Inequalities

These questions are taken from the Specimen Exam materials and the real 2018 papers for the new syllabus AS and A-level mathematics courses and arranged by chapter of the textbooks by Goldie et al (available here: <https://amzn.to/39umfr5> and <https://amzn.to/3hE8kBL>). There are a mixture of questions from OCR A, OCR B (MEI), Edexcel and AQA. Although the style of questions varies a little across the exam boards the content of the syllabus is almost identical so these are suitable for students preparing for any exam board.

Free problem sets for all other chapters, as well as video solutions, full past papers and other content for GCSE and A-level maths can be found at:

<https://mathsaurus.com/>

OCR B MEI Sample Paper 2 Question 1:

- 1** In this question you must show detailed reasoning.

Find the coordinates of the points of intersection of the curve $y = x^2 + x$ and the line $2x + y = 4$. [5]

OCR A Sample Paper 1 Question 1:

- 1** Solve the simultaneous equations.

$$\begin{aligned}x^2 + 8x + y^2 &= 84 \\x - y &= 10\end{aligned}$$

[4]

OCR A AS 2018 Paper 1 Question 2:

- 2** (i) The equation $x^2 + 3x + k = 0$ has repeated roots. Find the value of the constant k . [2]
- (ii) Solve the inequality $6 + x - x^2 > 0$. [2]
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Edexcel AS 2018 Paper 1 Question 2:

2. (i) Show that $x^2 - 8x + 17 > 0$ for all real values of x (3)

(ii) "If I add 3 to a number and square the sum, the result is greater than the square of the original number."

State, giving a reason, if the above statement is always true, sometimes true or never true. (2)

Edexcel AS Sample Paper 1 Question 10:

10. The equation $kx^2 + 4kx + 3 = 0$, where k is a constant, has no real roots.

Prove that

$$0 \leq k < \frac{3}{4} \quad (4)$$

OCR B MEI AS Sample Paper 1 Question 11:

11 **In this question you must show detailed reasoning.**

Determine for what values of k the graphs $y = 2x^2 - kx$ and $y = x^2 - k$ intersect. [6]

OCR A 2018 Paper 3 Question 3:

3 **In this question you must show detailed reasoning.**

A gardener is planning the design for a rectangular flower bed. The requirements are:

- the length of the flower bed is to be 3 m longer than the width,
- the length of the flower bed must be at least 14.5 m,
- the area of the flower bed must be less than 180 m^2 .

The width of the flower bed is x m.

By writing down and solving appropriate inequalities in x , determine the set of possible values for the width of the flower bed. [6]