



A Level Mathematics Year 2 Exam Questions by Topic
Chapter 7: Further algebra

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) and Edexcel. 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/>

Edexcel 2018 Paper 2 Question 11:

11.

$$\frac{1 + 11x - 6x^2}{(x - 3)(1 - 2x)} \equiv A + \frac{B}{(x - 3)} + \frac{C}{(1 - 2x)}$$

(a) Find the values of the constants A , B and C .

(4)

$$f(x) = \frac{1 + 11x - 6x^2}{(x - 3)(1 - 2x)} \quad x > 3$$

(b) Prove that $f(x)$ is a decreasing function.

(3)

Edexcel Sample Paper 2 Question 7:

7. (a) Use the binomial expansion, in ascending powers of x , to show that

$$\sqrt{4-x} = 2 - \frac{1}{4}x + kx^2 + \dots$$

where k is a rational constant to be found.

(4)

A student attempts to substitute $x = 1$ into both sides of this equation to find an approximate value for $\sqrt{3}$.

- (b) State, giving a reason, if the expansion is valid for this value of x .

(1)

OCR A 2018 Paper 1 Question 8:

- 8 (i) Find the first three terms in the expansion of $(4-x)^{-\frac{1}{2}}$ in ascending powers of x . [4]

- (ii) The expansion of $\frac{a+bx}{\sqrt{4-x}}$ is $16-x \dots$. Find the values of the constants a and b . [3]

OCR A Sample Paper 3 Question 5:

- 5 (i) Find the first three terms in the expansion of $(1+px)^{\frac{1}{3}}$ in ascending powers of x . [3]

- (ii) Given that the expansion of $(1+qx)(1+px)^{\frac{1}{3}}$ is

$$1+x-\frac{2}{9}x^2+\dots$$

find the possible values of p and q . [5]

OCR B MEI Sample Paper 3 Question 1:

- 1 Express $\frac{2}{x-1} + \frac{5}{2x+1}$ as a single fraction. [2]

OCR B MEI Sample Paper 3 Question 2:

- 2 Find the first four terms of the binomial expansion of $(1-2x)^{\frac{1}{2}}$.

State the set of values of x for which the expansion is valid. [4]