

A Level Mathematics Year 2 Exam Questions by Topic Chapter 5: Differentiation

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/>

OCR B MEI Sample Paper 1 Question 4:

4 Differentiate the following.

(i) $\sqrt{1-3x^2}$ [3]

(ii) $\frac{x^2}{3x+2}$ [3]

Edexcel Sample Paper 2 Question 3:

3. Given $y = x(2x + 1)^4$, show that

$$\frac{dy}{dx} = (2x + 1)^n (Ax + B)$$

where n , A and B are constants to be found.

(4)

OCR B MEI 2018 Paper 3 Question 4:

4 In this question you must show detailed reasoning.

A curve has equation $y = x - 5 + \frac{1}{x-2}$. The curve is shown in Fig. 4.

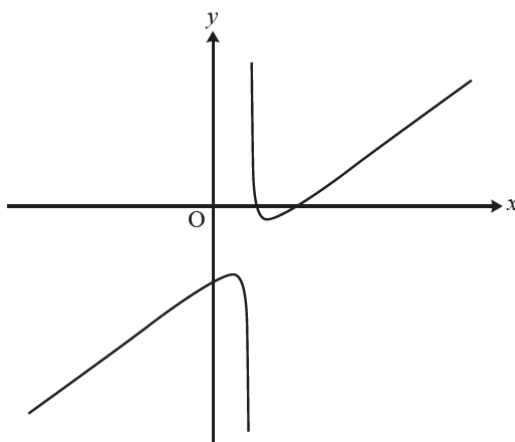


Fig. 4

- (i) Determine the coordinates of the stationary points on the curve. [5]
- (ii) Determine the nature of each stationary point. [3]
- (iii) Write down the equation of the vertical asymptote. [1]
- (iv) Deduce the set of values of x for which the curve is concave upwards. [1]

OCR B MEI Sample Paper 3 Question 11:

11 The curve $y = f(x)$ is defined by the function $f(x) = e^{-x} \sin x$ with domain $0 \leq x \leq 4\pi$.

- (i) (A) Show that the x -coordinates of the stationary points of the curve $y = f(x)$, when arranged in increasing order, form an arithmetic sequence.
(B) Show that the corresponding y -coordinates form a geometric sequence. [9]
- (ii) Would the result still hold with a larger domain? Give reasons for your answer [1]