

Differentiation

Question Paper 6

Level	A Level
Subject	Mathematics (Pure)
Exam Board	AQA
Module	Core 1
Topic	Calculus
Sub Topic	Differentiation
Booklet	Question Paper 6

Time Allowed: 22 minutes

Score: /18

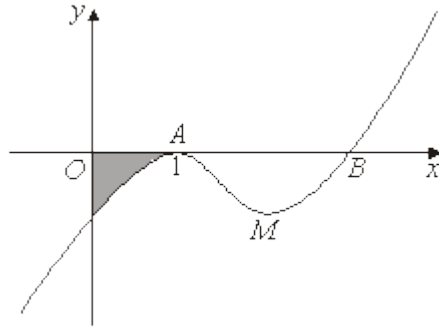
Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1

The curve with equation $y = x^3 - 5x^2 + 7x - 3$ is sketched below.



The curve touches the x -axis at the point $A(1, 0)$ and cuts the x -axis at the point B .

- (a) (i) Use the factor theorem to show that $x - 3$ is a factor of

$$p(x) = x^3 - 5x^2 + 7x - 3$$

(2)

- (ii) Hence find the coordinates of B .

(1)

- (b) The point M , shown on the diagram, is a minimum point of the curve with equation $y = x^3 - 5x^2 + 7x - 3$.

(i) Find $\frac{dy}{dx}$.

(2)

- (ii) Hence determine the x -coordinate of M .

(3)

- (c) Find the value of $\frac{d^2y}{dx^2}$ when $x = 1$.

(2)

- (d) (i) Find $\int (x^3 - 5x^2 + 7x - 3) dx$.

(4)

- (ii) Hence determine the area of the shaded region bounded by the curve and the coordinate axes.

(4)**(Total 18 marks)**