

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	



General Certificate of Education
Advanced Subsidiary Examination
June 2010

Mathematics

MPC2

Unit Pure Core 2

Monday 24 May 2010 1.30 pm to 3.00 pm

For this paper you must have:

- the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

Time allowed

- 1 hour 30 minutes

- Instructions**
- Use black ink or black ball-point pen. Pencil should only be used for drawing.
 - Fill in the boxes at the top of this page.
 - Answer **all** questions.
 - Write the question part reference (eg (a), (b)(i) etc) in the left-hand margin.
 - You must answer the questions in the spaces provided. Do not write outside the box around each page.
 - Show all necessary working; otherwise marks for method may be lost.
 - Do all rough work in this book. Cross through any work that you do not want to be marked.

- Information**
- The marks for questions are shown in brackets.
 - The maximum mark for this paper is 75.

- Advice**
- Unless stated otherwise, you may quote formulae, without proof, from the booklet.



J U N 1 0 M P C 2 0 1

4 (a) The expression $\left(1 - \frac{1}{x^2}\right)^3$ can be written in the form

$$1 + \frac{p}{x^2} + \frac{q}{x^4} - \frac{1}{x^6}$$

Find the values of the integers p and q . (2 marks)

(b) (i) Hence find $\int \left(1 - \frac{1}{x^2}\right)^3 dx$. (4 marks)

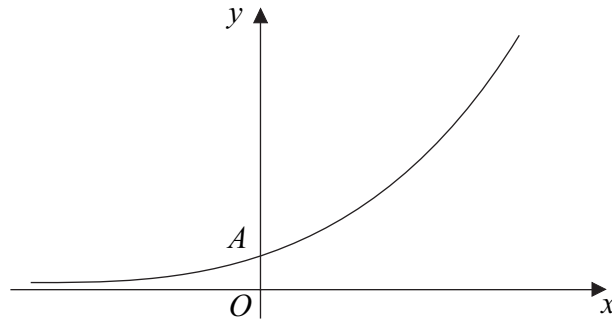
(ii) Hence find the value of $\int_{\frac{1}{2}}^1 \left(1 - \frac{1}{x^2}\right)^3 dx$. (2 marks)

QUESTION
PART
REFERENCE



8

The diagram shows a sketch of the curve $y = 2^{4x}$.



The curve intersects the y -axis at the point A .

(a) Find the value of the y -coordinate of A . (1 mark)

(b) Use the trapezium rule with six ordinates (five strips) to find an approximate value for $\int_0^1 2^{4x} dx$, giving your answer to two decimal places. (4 marks)

(c) Describe the geometrical transformation that maps the graph of $y = 2^{4x}$ onto the graph of $y = 2^{4x-3}$. (2 marks)

(d) The curve $y = 2^{4x}$ is translated by the vector $\begin{bmatrix} 1 \\ -\frac{1}{2} \end{bmatrix}$ to give the curve $y = g(x)$.

The curve $y = g(x)$ crosses the x -axis at the point Q . Find the x -coordinate of Q . (4 marks)

(e) (i) Given that

$$\log_a k = 3 \log_a 2 + \log_a 5 - \log_a 4$$

show that $k = 10$. (3 marks)

(ii) The line $y = \frac{5}{4}$ crosses the curve $y = 2^{4x-3}$ at the point P . Show that the x -coordinate of P is $\frac{1}{4 \log_{10} 2}$. (3 marks)

QUESTION
PART
REFERENCE



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

