Centre No.						Paper Reference				Surname	Initial(s)			
Candidate No.						7	3	6	2	/	0	2	Signature	
	Paper Reference(s)													

7362/02

London Examinations GCE

Pure Mathematics

Alternative Ordinary Level

Paper 2

Thursday 17 May 2007 - Morning

Time: 2 hours

Materials required for examination	Items included with question papers
Nil	Nil

Candidates are expected to have an electronic calculator when answering this paper.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and

Check that you have the correct question paper.

You must write your answer for each question in the space following the question.

If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

Full marks may be obtained for answers to ALL questions.

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

There are 10 questions in this question paper. The total mark for this paper is 100.

There are 28 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and legibly.

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Turn over

Total

Examiner's use only

Question Number

1

2

3

4

5

6

8

10



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Differentiate with respect to x , $y =$	(3)



(a) the length of MN , (b) the size of $\angle LNM$.	(3)
(b) the size of $\angle LNM$.	(3)
(b) the size of $\angle LNM$.	
	(3)
	(8)

uestion 3 continued	

(a) Find the coordinates of the points where the line with	h equation $y = 3x + 3$ intersects
the curve with equation $y = x^2 + x - 12$.	(-)
	(5)
(b) Find the set of values of x for which $x^2 + x - 12 \ge 3x$	+ 3
(b) That the set of values of x for which $x + x = 12 \geqslant 3x$	(2)
	()

uestion 4 continued	

			Leave blank
5.	(a) Solve the equation $\log_4 2 = p$.	(1)	
		(1)	
	Given that $\log_2 3 = k \log_4 3$		
	(b) find the value of <i>k</i> .	(2)	
	$\left(x^{5x-2} \right)$	(2)	
	(c) Show that $5x \log_4 x - 2 \log_4 x - 10x \log_2 3 + 4 \log_2 3 = \log_4 \left(\frac{x^{5x-2}}{3^{20x-8}}\right)$.		
		(4)	
	(d) Hence solve the equation $5x \log_4 x - 2\log_4 x - 10x \log_2 3 + 4\log_2 3 = 0$.		
		(4)	
			1

uestion 5 continued	



	the block is 450 cm^3 . The total surface area of the block is $A \text{ cm}^2$.									
	(a) Show that $A = 6x^2 + \frac{1200}{3}$.									
	x	(4)								
	(b) Find, to 3 significant figures, the value of x for which A is a minimum. Verifying the figures of x for which y is a minimum.	erify that								
the value you have found does give a minimum value for A .	(5)									
		(5)								
	(c) Find, to the nearest whole number, the minimum value of A .	(2)								
		(2)								
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	Q6
(Total 11 marks)	

7.

Figure 1

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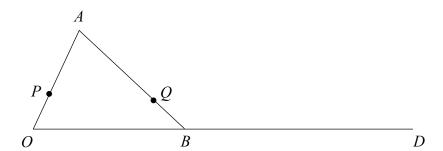


Figure 1 shows $\triangle OAB$ where $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$. The point *P* divides *OA* in the ratio 2:3 and the point *Q* divides *AB* in the ratio 5:2. The side *OB* is produced to the point *D*, where $OD = \frac{5}{2}OB.$

- (a) Find, in terms of a and b,
 - (i) \overrightarrow{PB} ,

- (ii) \overrightarrow{AD} , (iii) \overrightarrow{AB} , (iv) \overrightarrow{PQ} , (v) \overrightarrow{PD} .

(8)

- (b) Show that
 - (i) PB is parallel to AD,
 - (ii) P, Q and D are collinear.

(4)

estion 7 continued	

8.	The sum to infinity of a convergent geometric series is 243 and the sum of the first terms of this series is 240.	t four
	(a) Find the two possible values of the common ratio of the series, giving your ansas exact fractions.	swers
		(5)
	For each value of the common ratio	
	(b) find the first term of the series.	(4)
	Given that the sum of the second and third terms is negative,	
	(c) find the eighth term of the series.	(2)
	(d) Find, to 2 decimal places, the sum of the first 8 terms of the series.	(2)

	Leave
Question 8 continued	blank
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Question 8 continued	

Question 8 continued		Leave blank
		Q8
Т	otal 13 marks)	

(4)

- 9. (a) Show that
 - (i) $(\alpha + \beta)(\alpha^2 \alpha\beta + \beta^2) \equiv \alpha^3 + \beta^3$,

(ii)
$$(\alpha - \beta)(\alpha^2 + \alpha\beta + \beta^2) \equiv \alpha^3 - \beta^3$$
. (3)

The equation $2x^2 + 7x + 4 = 0$ has roots α and β , where $\alpha > \beta$. Without solving the equation, calculate the value of

(b)
$$(\alpha - \beta)^2$$
, (3)

(c)
$$\alpha^3 + \beta^3$$
. (2)

Hence

- (d) find the value of $\alpha^3 \beta^3$, giving your answer in the form $k\sqrt{m}$, where k is rational and m is a prime number, (2)
- (e) form a quadratic equation, with integer coefficients, which has roots $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$.

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Question 9 continued	Leave

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10.

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$$\cos(A+B) \equiv \cos A \cos B - \sin A \sin B$$

 $\sin(A+B) \equiv \sin A \cos B + \cos A \sin B.$

(a) Write down an expression for $\sin 2\theta$ in terms of $\sin \theta$ and $\cos \theta$.

(1)

Show that

(b)
$$\sin^2 \theta = \frac{1}{2} (1 - \cos 2\theta),$$

(2)

(c)
$$\sin^2 (A+B) - \sin^2 (A-B) \equiv \sin 2A \sin 2B$$
.

(5)

Hence

(d) show that (i) $\sin^2 3\theta - \sin^2 \theta = \sin 4\theta \sin 2\theta$,

(ii)
$$\sin^2 3\theta - \sin^2 \theta = \frac{1}{2}(\cos 2\theta - \cos 6\theta)$$
,

(4)

(e) find the exact value of $\int_0^{\frac{\pi}{3}} (6 \sin 4\theta \sin 2\theta + 2) d\theta$.

(5)

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Question 10 continued	
	1

uestion 10 continued	

END	TOTAL FOR TAILER, TWO MARKS	
	(Total 17 marks) TOTAL FOR PAPER: 100 MARKS	
		Q10
Question 10 continued		



