Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						7	3	6	2	/	0	1	Signature	

Paper Reference(s)

7362/01

London Examinations GCE

Pure Mathematics

Alternative Ordinary Level

Paper 1

Friday 15 January 2010 – Morning

Time: 2 hours

Examiner's use only		

Team Leader's use only		

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Total	

Materials required for examination
Nil

Items included with question papers
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, initials and signature.
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 11 questions in this question paper. The total mark for this paper is 100.
There are 24 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and legibly.

This publication may be reproduced only in accordance with Edexcel Limited copyright policy.
©2010 Edexcel Limited.

Printer's Log. No.
N35375A
W850/R7362/57570 4/4/6/3

N 3 5 3 7 5 A 0 1 2 4

Turn over

edexcel
advancing learning, changing lives

Leave blank

1. In ΔABC, $AB = 5.7\,\text{cm}$, $BC = 8.4\,\text{cm}$ and $\angle ACB$ is $42°$.

Find, to the nearest $0.1°$, the two possible sizes of $\angle BAC$.

(4)

Q1

(Total 4 marks)

N 3 5 3 7 5 A 0 2 2 4

Leave blank

2. $$\mathrm{f}(x) = x^3 + px^2 + qx - 36, \quad p \text{ and } q \in \mathbb{Z}^+$$

The three roots of the equation $\mathrm{f}(x) = 0$ are α, α and 4, where $\alpha \in \mathbb{Z}^+$.

(a) Show that $\alpha = 3$

(2)

(b) Hence find the value of p and the value of q.

(3)

Q2

(Total 5 marks)

N 3 5 3 7 5 A 0 3 2 4

Turn over

Leave blank

3. The volume of a sphere is increasing at a rate of $25\,\text{cm}^3/\text{s}$.

Find the rate of increase of the surface area of the sphere when the radius is $2.5\,\text{cm}$.

(6)

Q3

(Total 6 marks)

N 3 5 3 7 5 A 0 4 2 4

Leave blank

4. Solve the equations $xy = 6$,

$$xy + x + y = 11$$

(6)

Q4

(Total 6 marks)

N 3 5 3 7 5 A 0 5 2 4

Turn over

Leave blank

5. Relative to a fixed origin O, the position vector of the point A is $3\mathbf{i}+8\mathbf{j}$ and the position vector of the point B is $12\mathbf{i}+q\mathbf{j}$.

The point C divides AB internally in the ratio $1:2$ and $\overrightarrow{OC}=p\mathbf{i}+4\mathbf{j}$.

(a) Find the value of p and the value of q.

(5)

The point D lies on OB and the line DC is parallel to OA. The mid-point of DC is M.

(b) Find, in terms of $\mathbf{i}$ and $\mathbf{j}$, the position vector of M.

(3)

N 3 5 3 7 5 A 0 6 2 4

Leave blank

Question 5 continued

Q5

(Total 8 marks)

Leave blank

6.

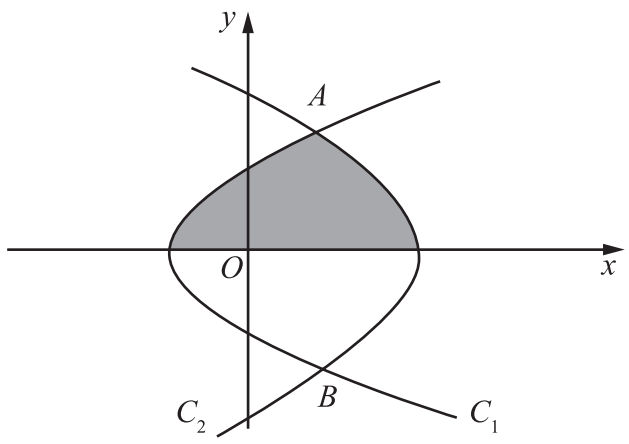

Figure 1

Figure 1 shows the curve C_1 with equation $y^2 = 8x + 4$ and the curve C_2 with equation $y^2 = 8 - 4x$.

The curves C_1 and C_2 intersect at the points A and B.

(a) Find the exact coordinates of A.

(3)

The shaded region enclosed by C_1, C_2 and the x-axis is rotated through $360°$ about the x-axis.

(b) Find, in terms of π, the volume of the solid generated.

(6)

N 3 5 3 7 5 A 0 8 2 4

Leave blank

Question 6 continued

(Total 9 marks)

Q6

Leave blank

7. The sum, S_n, of the first n terms of an arithmetic series is given by $S_n = \frac{n}{4}(13+7n)$.

Find

(a) the first term of the series,

(1)

(b) the rth term of the series,

(3)

(c) the common difference of the series.

(2)

The pth term of the series is a multiple of the first term.

(d) Given that $p \neq 1$, find the least value of p.

(3)

N 3 5 3 7 5 A 0 1 0 2 4

Leave blank

Question 7 continued

Q7

(Total 9 marks)

Leave blank

8. (a) Expand fully $(a+bx)^6$, simplifying each term as far as possible.

(4)

In the expansion of $(a+bx)^6$, $a \neq 0$, $b \neq 0$, the coefficient of x^3 is twice the coefficient of x^4. When $x=3$ the value of $(a+bx)^6$ is 46 656.

(b) Find the possible pairs of values of a and b.

(6)

N 3 5 3 7 5 A 0 1 2 2 4

Leave blank

Question 8 continued

(Total 10 marks)

Q8

Leave blank

9. Solve the equation

(a) $\log_x 125 = 3$

(2)

(b) $\log_4 (9y + 4) = 4$

(3)

(c) $3 - \log_3 p = \log_p 9$

(6)

N 3 5 3 7 5 A 0 1 4 2 4

Leave blank

Question 9 continued

(Total 11 marks)

Q9

N 3 5 3 7 5 A 0 1 5 2 4

Leave blank

10. The curve C_1, with equation $y = x^2$, meets the curve C_2, with equation $y = \frac{x^2}{x-1}$, at the origin and at the point A.

Find

(a) the coordinates of A,

(4)

(b) an equation of the tangent to C_1 at A,

(4)

(c) an equation of the tangent to C_2 at A.

(4)

The tangent to C_1 at A meets the y-axis at the point B and the tangent to C_2 at A meets the y-axis at the point D.

(d) Find the area of ΔBAD.

(3)

N 3 5 3 7 5 A 0 1 6 2 4

Leave blank

Question 10 continued

Leave blank

Question 10 continued

Leave blank

Question 10 continued

Q10

(Total 15 marks)

Leave blank

11.

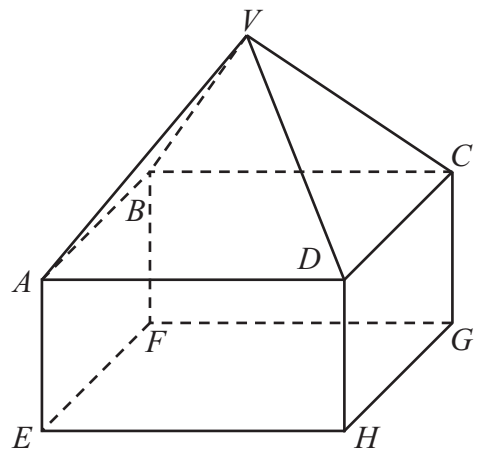

Figure 2

Figure 2 shows a solid *VABCDEFGH* which consists of a cuboid *ABCDEFGH* and a right pyramid *VABCD*.

$AB = 5$ cm, $BC = 12$ cm, $EC = 17$ cm.

The height of the pyramid is 10 cm.

Calculate, in cm to 3 significant figures, the length of

(a) *AE*,

(3)

(b) *VA*.

(3)

Find, in degrees to the nearest $0.1°$, the size of the angle between

(c) *EC* and the plane *ABCD*,

(3)

(d) the plane *VAB* and the plane *ABGH*,

(4)

(e) the plane *VAB* and the plane *VCD*.

(4)

N 3 5 3 7 5 A 0 2 0 2 4

Leave blank

Question 11 continued

Leave blank

Question 11 continued

Leave blank

Question 11 continued

Q11

(Total 17 marks)

TOTAL FOR PAPER: 100 MARKS

END

N 3 5 3 7 5 A 0 2 3 2 4

BLANK PAGE