Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	6	6	4	/	0	1	Signature	

Paper Reference(s)

6664/01

Edexcel GCE

Core Mathematics C2

Advanced Subsidiary

Monday 2 June 2008 – Morning

Time: 1 hour 30 minutes

Examiner's use only

Team Leader's use only

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

Materials required for examination
Mathematical Formulae (Green)

Items included with question papers
Nil

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

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.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
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 9 questions in this question paper. The total mark for this paper is 75.
There are 28 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You should show sufficient working to make your methods clear to the Examiner.
Answers without working may not gain full credit.

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Turn over

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1.

$$f(x) = 2x^3 - 3x^2 - 39x + 20$$

(a) Use the factor theorem to show that $(x + 4)$ is a factor of $f(x)$.

(2)

(b) Factorise $f(x)$ completely.

(4)

Leave blank

Question 1 continued

Q1

(Total 6 marks)

Leave blank

2. $$y = \sqrt{(5^x + 2)}$$

(a) Complete the table below, giving the values of y to 3 decimal places.

x	0	0.5	1	1.5	2
y			2.646	3.630	

(2)

(b) Use the trapezium rule, with all the values of y from your table, to find an approximation for the value of $\int_0^2 \sqrt{(5^x + 2)}\, dx$.

(4)

H 3 0 7 2 2 A 0 4 2 8

Leave blank

Question 2 continued

(Total 6 marks)

Q2

Leave blank

3. (a) Find the first 4 terms, in ascending powers of x, of the binomial expansion of $(1 + ax)^{10}$, where a is a non-zero constant. Give each term in its simplest form.

(4)

Given that, in this expansion, the coefficient of x^3 is double the coefficient of x^2,

(b) find the value of a.

(2)

Leave blank

Question 3 continued

Q3

(Total 6 marks)

Leave blank

4. (a) Find, to 3 significant figures, the value of x for which $5^x = 7$.

(2)

(b) Solve the equation $5^{2x} - 12(5^x) + 35 = 0$.

(4)

H 3 0 7 2 2 A 0 8 2 8

Leave blank

Question 4 continued

Q4

(Total 6 marks)

Leave blank

5. The circle C has centre (3, 1) and passes through the point $P(8, 3)$.

(a) Find an equation for C.

(4)

(b) Find an equation for the tangent to C at P, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(5)

H 3 0 7 2 2 A 0 1 0 2 8

Leave blank

Question 5 continued

Q5

(Total 9 marks)

Leave blank

6. A geometric series has first term 5 and common ratio $\frac{4}{5}$.

Calculate

(a) the 20th term of the series, to 3 decimal places,

(2)

(b) the sum to infinity of the series.

(2)

Given that the sum to k terms of the series is greater than 24.95,

(c) show that $k > \frac{\log 0.002}{\log 0.8}$,

(4)

(d) find the smallest possible value of k.

(1)

H 3 0 7 2 2 A 0 1 2 2 8

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Question 6 continued

Leave blank

Question 6 continued

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Question 6 continued

Q6

(Total 9 marks)

Leave blank

7.

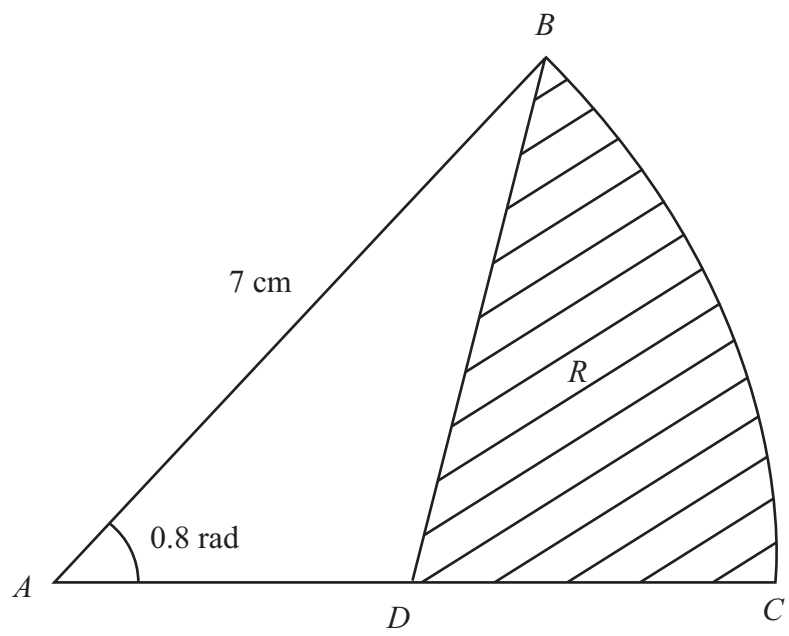

Figure 1

Figure 1 shows ABC, a sector of a circle with centre A and radius 7 cm.

Given that the size of $\angle BAC$ is exactly 0.8 radians, find

(a) the length of the arc BC,

(2)

(b) the area of the sector ABC.

(2)

The point D is the mid-point of AC. The region R, shown shaded in Figure 1, is bounded by CD, DB and the arc BC.

Find

(c) the perimeter of R, giving your answer to 3 significant figures,

(4)

(d) the area of R, giving your answer to 3 significant figures.

(4)

Leave blank

Question 7 continued

Leave blank

Question 7 continued

Leave blank

Question 7 continued

(Total 12 marks)

Q7

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8.

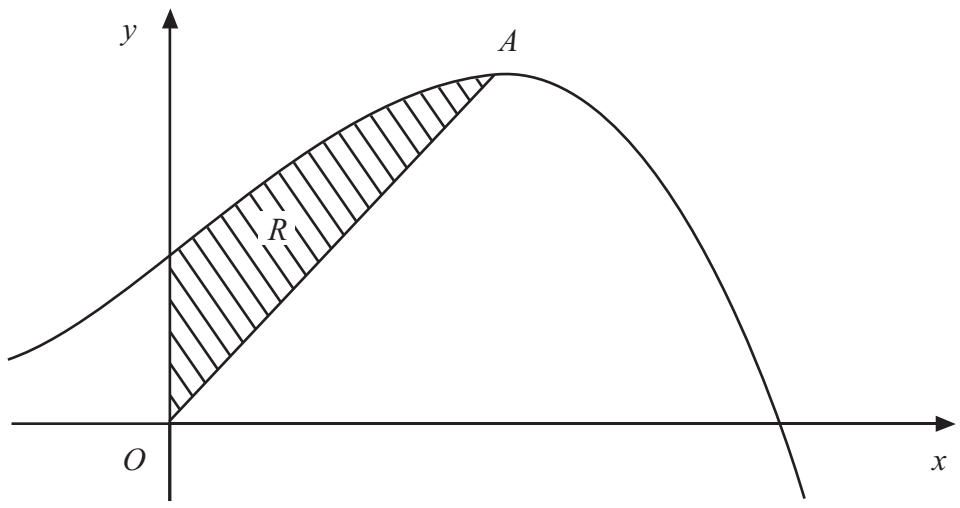

Figure 2

Figure 2 shows a sketch of part of the curve with equation $y = 10 + 8x + x^2 - x^3$.

The curve has a maximum turning point A.

(a) Using calculus, show that the x-coordinate of A is 2.

(3)

The region R, shown shaded in Figure 2, is bounded by the curve, the y-axis and the line from O to A, where O is the origin.

(b) Using calculus, find the exact area of R.

(8)

H 3 0 7 2 2 A 0 2 0 2 8

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Question 8 continued

Leave blank

Question 8 continued

Leave blank

Question 8 continued

(Total 11 marks)

Q8

Leave blank

9. Solve, for $0 \leqslant x < 360°$,

(a) $\sin(x - 20°) = \frac{1}{\sqrt{2}}$ **(4)**

(b) $\cos 3x = -\frac{1}{2}$ **(6)**

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Question 9 continued

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Question 9 continued

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Question 9 continued

Q9

(Total 10 marks)

TOTAL FOR PAPER: 75 MARKS

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