

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

Paper Reference(s)

6666/01

Edexcel GCE Core Mathematics C4 Advanced Level

Tuesday 23 January 2007 – Afternoon
Time: 1 hour 30 minutes

Examiner's use only

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Team Leader's use only

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ND003924875

Materials required for examination

Mathematical Formulae (Green)

Items included with question papers

Nil

Candidates may use any calculator **EXCEPT** those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may **NOT** use calculators such as the Texas Instruments TI 89, TI 92, Casio CFX 9970G, Hewlett Packard HP 48G.

Question Number	Leave Blank
1	
2	
3	
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6	
7	
8	
Total	

Instructions to Candidates

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

Check that you have the correct question paper.

When a calculator is used, the answer should be given to an appropriate degree of accuracy.

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

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 8 questions in this question paper. The total mark for this paper is 75.

There are 20 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 must show sufficient working to make your methods clear to the examiner. Answers without working may gain no credit.

Turn over

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1.

$$f(x) = (2 - 5x)^{-2}, \quad |x| < \frac{2}{5}.$$

Find the binomial expansion of $f(x)$, in ascending powers of x , as far as the term in x^3 , giving each coefficient as a simplified fraction.

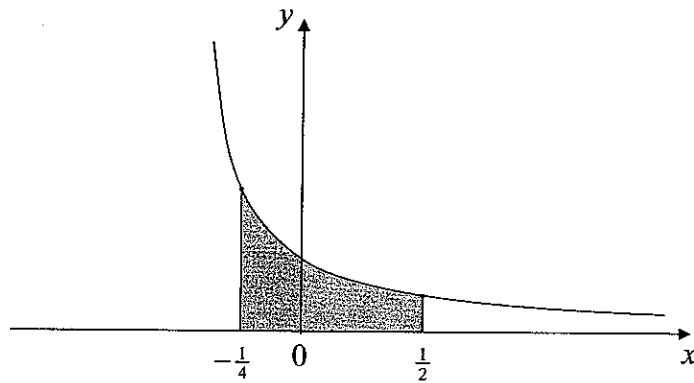
(5)

Handwritten area with horizontal lines for the student's solution.



2.

Figure 1



The curve with equation $y = \frac{1}{3(1+2x)}$, $x > -\frac{1}{2}$, is shown in Figure 1.

The region bounded by the lines $x = -\frac{1}{4}$, $x = \frac{1}{2}$, the x -axis and the curve is shown shaded in Figure 1.

This region is rotated through 360 degrees about the x -axis.

(a) Use calculus to find the exact value of the volume of the solid generated.

(5)

Figure 2

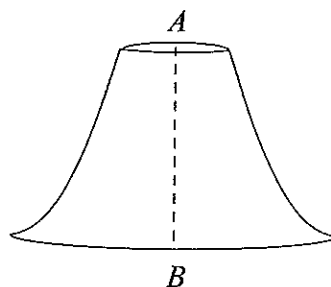


Figure 2 shows a paperweight with axis of symmetry AB where $AB = 3$ cm. A is a point on the top surface of the paperweight, and B is a point on the base of the paperweight. The paperweight is geometrically similar to the solid in part (a).

(b) Find the volume of this paperweight.

(2)



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3. A curve has parametric equations

$$x = 7 \cos t - \cos 7t, \quad y = 7 \sin t - \sin 7t, \quad \frac{\pi}{8} < t < \frac{\pi}{3}.$$

(a) Find an expression for $\frac{dy}{dx}$ in terms of t . You need not simplify your answer.

(3)

(b) Find an equation of the normal to the curve at the point where $t = \frac{\pi}{6}$.

Give your answer in its simplest exact form.

(6)



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Question 4 continued

Lined area for writing the answer to Question 4.

(Total 12 marks)

Q4

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5. A set of curves is given by the equation $\sin x + \cos y = 0.5$.

(a) Use implicit differentiation to find an expression for $\frac{dy}{dx}$.

(2)

For $-\pi < x < \pi$ and $-\pi < y < \pi$,

(b) find the coordinates of the points where $\frac{dy}{dx} = 0$.

(5)

Lined writing area consisting of multiple horizontal lines for student responses.



Question 5 continued

(Total 7 marks)

Q5



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Question 6 continued

Lined writing area for the answer to Question 6.

(Total 6 marks)

Q6



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



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Question 7 continued

A series of horizontal lines for writing answers.



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Question 7 continued

Lined area for writing answers to Question 7.

(Total 14 marks)

Q7

Grading box for Question 7.



8.

$$I = \int_0^5 e^{\sqrt{3x+1}} dx.$$

- (a) Given that $y = e^{\sqrt{3x+1}}$, complete the table with the values of y corresponding to $x = 2, 3$ and 4 .

x	0	1	2	3	4	5
y	e^1	e^2				e^4

(2)

- (b) Use the trapezium rule, with all the values of y in the completed table, to obtain an estimate for the original integral I , giving your answer to 4 significant figures.

(3)

- (c) Use the substitution $t = \sqrt{3x+1}$ to show that I may be expressed as $\int_a^b kte' dt$, giving the values of a, b and k .

(5)

- (d) Use integration by parts to evaluate this integral, and hence find the value of I correct to 4 significant figures, showing all the steps in your working.

(5)





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Question 8 continued

(Total 15 marks)

Q8

TOTAL FOR PAPER: 75 MARKS

END

