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

Tuesday 10 January 2006 – Afternoon

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	Items included with question papers
Mathematical Formulae (Green)	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.

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

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1. $f(x) = 2x^3 + x^2 - 5x + c$, where c is a constant.

Given that $f(1) = 0$,

(a) find the value of c,

(2)

(b) factorise $f(x)$ completely,

(4)

(c) find the remainder when $f(x)$ is divided by $(2x - 3)$.

(2)

Leave blank

2. (a) Find the first 3 terms, in ascending powers of x, of the binomial expansion of

$$(1 + px)^9,$$

where p is a constant.

(2)

These first 3 terms are 1, $36x$ and qx^2, where q is a constant.

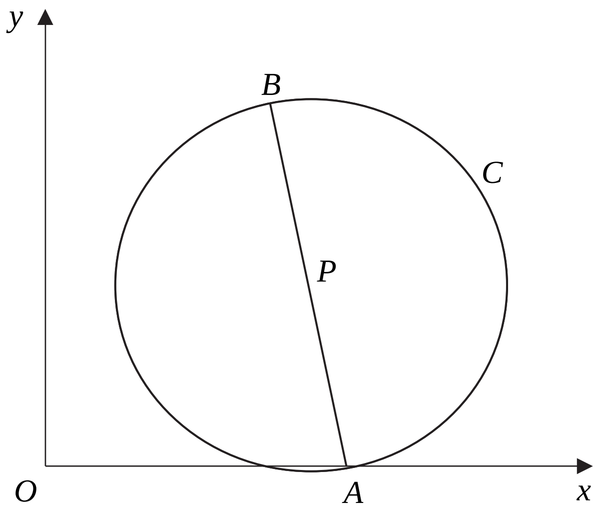
(b) Find the value of p and the value of q.

(4)

Leave blank

3.

Figure 1



In Figure 1, $A(4, 0)$ and $B(3, 5)$ are the end points of a diameter of the circle C.

Find

(a) the exact length of AB,

(2)

(b) the coordinates of the midpoint P of AB,

(2)

(c) an equation for the circle C.

(3)

Leave blank

Question 3 continued

Q3

(Total 7 marks)

Leave blank

4. The first term of a geometric series is 120. The sum to infinity of the series is 480.

(a) Show that the common ratio, r, is $\frac{3}{4}$.

(3)

(b) Find, to 2 decimal places, the difference between the 5th and 6th term.

(2)

(c) Calculate the sum of the first 7 terms.

(2)

The sum of the first n terms of the series is greater than 300.

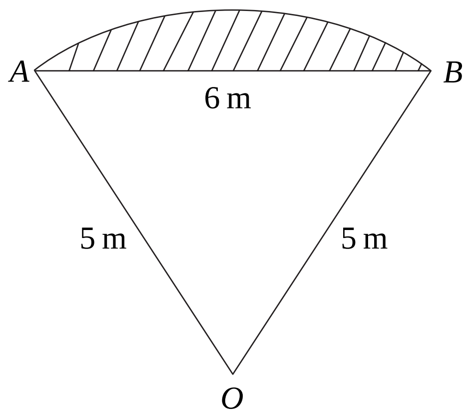
(d) Calculate the smallest possible value of n.

(4)

Leave blank

5.

Figure 2



In Figure 2 OAB is a sector of a circle radius 5 m. The chord AB is 6 m long.

(a) Show that $\cos A\hat{O}B = \frac{7}{25}$.
(2)

(b) Hence find the angle $A\hat{O}B$ in radians, giving your answer to 3 decimal places.
(1)

(c) Calculate the area of the sector OAB.
(2)

(d) Hence calculate the shaded area.
(3)

Leave blank

Question 5 continued

Q5

(Total 8 marks)

Leave blank

6. The speed, v m s^{-1}, of a train at time t seconds is given by

$$v = \sqrt{(1.2^t - 1)}, \quad 0 \leqslant t \leqslant 30.$$

The following table shows the speed of the train at 5 second intervals.

t	0	5	10	15	20	25	30
v	0	1.22	2.28		6.11		

(a) Complete the table, giving the values of v to 2 decimal places.

(3)

The distance, s metres, travelled by the train in 30 seconds is given by

$$s = \int_0^{30} \sqrt{(1.2^t - 1)}\,\mathrm{d}t\,.$$

(b) Use the trapezium rule, with all the values from your table, to estimate the value of s.

(3)

Leave blank

7. The curve C has equation

$$y = 2x^3 - 5x^2 - 4x + 2.$$

(a) Find $\frac{dy}{dx}$.

(2)

(b) Using the result from part (a), find the coordinates of the turning points of C.

(4)

(c) Find $\frac{d^2y}{dx^2}$.

(2)

(d) Hence, or otherwise, determine the nature of the turning points of C.

(2)

Leave blank

Question 7 continued

(Total 10 marks)

Q7

Leave blank

8. (a) Find all the values of θ, to 1 decimal place, in the interval $0° \leqslant \theta < 360°$ for which

$$5 \sin(\theta + 30°) = 3.$$

(4)

Leave blank

Question 8 continued

(b) Find all the values of θ, to 1 decimal place, in the interval $0° \leqslant \theta < 360°$ for which

$$\tan^2\theta = 4.$$

(5)

Q8

(Total 9 marks)

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9.

Figure 3

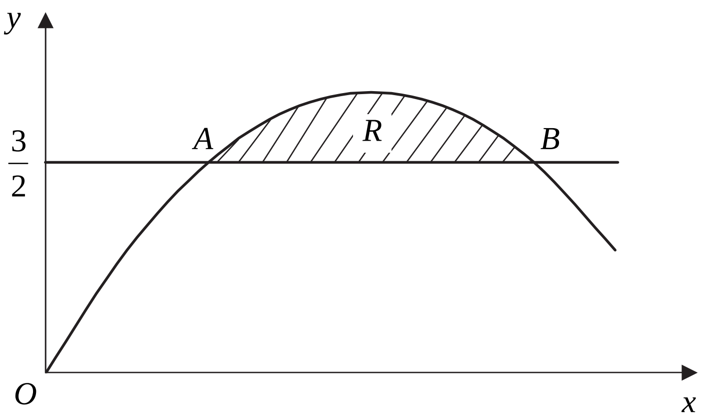

Figure 3 shows the shaded region *R* which is bounded by the curve $y = -2x^2 + 4x$ and the line $y = \frac{3}{2}$. The points *A* and *B* are the points of intersection of the line and the curve.

Find

(a) the *x*-coordinates of the points *A* and *B*,

(4)

(b) the exact area of *R*.

(6)

Leave blank

Question 9 continued

Q9

(Total 10 marks)

TOTAL FOR PAPER: 75 MARKS

END