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

Paper Reference(s)

6663/01

Edexcel GCE

Core Mathematics C1

Advanced Subsidiary

Wednesday 9 January 2008 – 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	
10	
11	
Total	

Materials required for examination
Mathematical Formulae (Green)

Items included with question papers
Nil

Calculators may NOT be used in this examination.

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.
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 11 questions in this question paper. The total mark for this paper is 75.
There are 24 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.

This publication may be reproduced only in accordance with Edexcel Limited copyright policy.
©2008 Edexcel Limited.

Printer's Log. No.
N25561A
W850/R6663/57570 3/3/3/3/3/3

N 2 5 5 6 1 A 0 1 2 4

Turn over

edexcel
advancing learning, changing lives

Leave blank

1. Find $\int (3x^2 + 4x^5 - 7)\,\mathrm{d}x$.

(4)

Q1

(Total 4 marks)

N 2 5 5 6 1 A 0 2 2 4

Leave blank

2. (a) Write down the value of $16^{\frac{1}{4}}$.

(1)

(b) Simplify $(16x^{12})^{\frac{3}{4}}$.

(2)

Q2

(Total 3 marks)

N 2 5 5 6 1 A 0 3 2 4

Turn over

Leave blank

3. Simplify

$$\frac{5-\sqrt{3}}{2+\sqrt{3}},$$

giving your answer in the form $a + b\sqrt{3}$, where a and b are integers.

(4)

Q3

(Total 4 marks)

N 2 5 5 6 1 A 0 4 2 4

Leave blank

4. The point A (–6, 4) and the point B (8, –3) lie on the line L.

(a) Find an equation for L in the form $ax + by + c = 0$, where a, b and c are integers.
(4)

(b) Find the distance AB, giving your answer in the form $k\sqrt{5}$, where k is an integer.
(3)

Q4

(Total 7 marks)

Leave blank

5. (a) Write $\dfrac{2\sqrt{x}+3}{x}$ in the form $2x^p+3x^q$ where p and q are constants.

(2)

Given that $y = 5x - 7 + \dfrac{2\sqrt{x}+3}{x}$, $\quad x > 0$,

(b) find $\dfrac{dy}{dx}$, simplifying the coefficient of each term.

(4)

N 2 5 5 6 1 A 0 6 2 4

Leave blank

6.

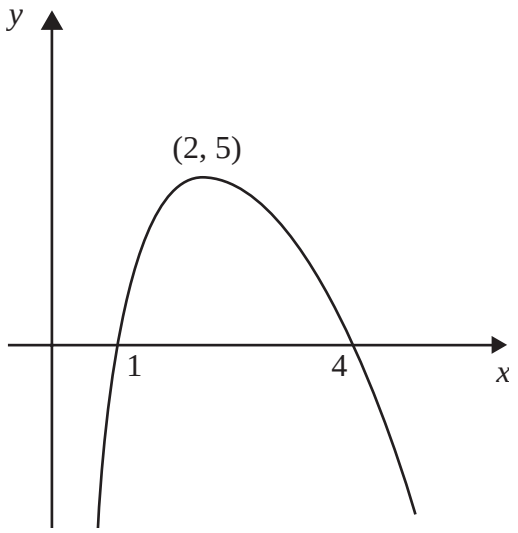

Figure 1

Figure 1 shows a sketch of the curve with equation $y = \mathrm{f}(x)$. The curve crosses the x-axis at the points (1, 0) and (4, 0). The maximum point on the curve is (2, 5).
In separate diagrams sketch the curves with the following equations.
On each diagram show clearly the coordinates of the maximum point and of each point at which the curve crosses the x-axis.

(a) $y = 2\mathrm{f}(x)$,

(3)

(b) $y = \mathrm{f}(-x)$.

(3)

The maximum point on the curve with equation $y = \mathrm{f}(x + a)$ is on the y-axis.

(c) Write down the value of the constant a.

(1)

N 2 5 5 6 1 A 0 8 2 4

Leave blank

Question 6 continued

Q6

(Total 7 marks)

N 2 5 5 6 1 A 0 9 2 4

Turn over

Leave blank

7. A sequence is given by:

$$x_1 = 1,$$
$$x_{n+1} = x_n(p + x_n),$$

where p is a constant ($p \neq 0$).

(a) Find x_2 in terms of p.

(1)

(b) Show that $x_3 = 1 + 3p + 2p^2$.

(2)

Given that $x_3 = 1$,

(c) find the value of p,

(3)

(d) write down the value of x_{2008}.

(2)

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

Leave blank

Question 7 continued

Q7

(Total 8 marks)

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

Turn over

Leave blank

8. The equation

$$x^2 + kx + 8 = k$$

has no real solutions for x.

(a) Show that k satisfies $k^2 + 4k - 32 < 0$.

(3)

(b) Hence find the set of possible values of k.

(4)

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

Leave blank

9. The curve C has equation $y = \mathrm{f}(x)$, $x > 0$, and $\mathrm{f}'(x) = 4x - 6\sqrt{x} + \dfrac{8}{x^2}$.

Given that the point $P(4, 1)$ lies on C,

(a) find $\mathrm{f}(x)$ and simplify your answer.

(6)

(b) Find an equation of the normal to C at the point $P(4, 1)$.

(4)

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

Leave blank

Question 9 continued

Q9

(Total 10 marks)

Leave blank

10. The curve C has equation

$$y = (x+3)(x-1)^2 .$$

(a) Sketch C showing clearly the coordinates of the points where the curve meets the coordinate axes.

(4)

(b) Show that the equation of C can be written in the form

$$y = x^3 + x^2 - 5x + k,$$

where k is a positive integer, and state the value of k.

(2)

There are two points on C where the gradient of the tangent to C is equal to 3.

(c) Find the x-coordinates of these two points.

(6)

Leave blank

Question 10 continued

Q10

(Total 12 marks)

N 2 5 5 6 1 A 0 1 9 2 4

Turn over

Leave blank

11. The first term of an arithmetic sequence is 30 and the common difference is –1.5

(a) Find the value of the 25th term.

(2)

The rth term of the sequence is 0.

(b) Find the value of r.

(2)

The sum of the first n terms of the sequence is S_n.

(c) Find the largest positive value of S_n.

(3)

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

Leave blank

Question 11 continued

Q11

(Total 7 marks)

TOTAL FOR PAPER: 75 MARKS

END

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