Mathematics C1

Examiner's use only

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Past Paper

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Centre No.					Pape	er Refer	ence			Surname	Initial(s)
Candidate No.			6	6	6	3	/	0	1	Signature	

Paper Reference(s)

# 6663/01

# **Edexcel GCE**

# Core Mathematics C1 **Advanced Subsidiary**

Monday 22 May 2006 – Morning

Time: 1 hour 30 minutes



Materials required for examination Mathematical Formulae (Green)

Items included with question papers

Calculators may NOT be used in this examination.

### **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.

### **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.

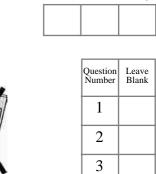
### **Advice to Candidates**

You must ensure that your answers to parts of questions are clearly labelled.

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

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Total

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Find $\int (6x^2 + 2 + x^{-\frac{1}{2}}) dx$ , giving each term in its simplest form.	(4)

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	f values of x for which	Lea bla	ave
	$x^2 - 7x - 18 > 0.$	(4)	

Q2

(Total 4 marks)

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- 3. On separate diagrams, sketch the graphs of
  - (a)  $y = (x+3)^2$ ,

**(3)** 

(b)  $y = (x + 3)^2 + k$ , where k is a positive constant.

**(2)** 

Show on each sketch the coordinates of each point at which the graph meets the axes.

(Total 5 marks)



Q3

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**4.** A sequence  $a_1, a_2, a_3, \ldots$  is defined by

$$a_1 = 3$$
,

$$a_{n+1} = 3a_n - 5, \quad n \geqslant 1.$$

(a) Find the value of  $a_2$  and the value of  $a_3$ .

**(2)** 

(b) Calculate the value of  $\sum_{r=1}^{5} a_r$ .

**(3)** 

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Differentiate with respect to <i>x</i>	
(a) $x^4 + 6\sqrt{x}$ ,	
	(3)
$(x+4)^2$	
(b) $\frac{(x+4)^2}{x}$ .	
	(4)

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Question 5 continued		
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(Total 7 marks)

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6	(a) Expand and simplify $(4 + \sqrt{3})(4 - \sqrt{3})$	

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6.	(a)	Expand and	l simplify (4 +	$\sqrt{3}$ )(4 – 1	√3).
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**(2)** 

(b)	Express	$\frac{26}{4+\sqrt{3}}$	in the form	$a+b\sqrt{3}$ ,	where a	and $b$ ar	e integers.
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**(2)** 

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7.	An athlete prepares for a race by completing a practice run on each of 11 consecuting days. On each day after the first day, he runs further than he ran on the previous day. The lengths of his 11 practice runs form an arithmetic sequence with first term $a \text{ km}$ are common difference $d \text{ km}$ .	ve he	bla
	He runs 9 km on the 11th day, and he runs a total of 77 km over the 11 day period.		
	Find the value of $a$ and the value of $d$ .		
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Question 7 continued	l	
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• The equation $x^2 + 2px + (3p + 4) = 0$ , where p is a positive constant, has each	qual roots.
(a) Find the value of p.	
	(4)
(b) For this value of p, solve the equation $x^2 + 2px + (3p + 4) = 0$ .	
(c) For any value of p, solve are equation $x + 2px + (ep + 1)$	(2)

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Question 8 continue	d	
destion o continue	u.	

<ul> <li>a) express f(x) in the form x(ax² + bx + c), where a, b and c are constants.</li> <li>(3)</li> <li>b) Hence factorise f(x) completely.</li> <li>(2)</li> <li>(2)</li> <li>(2)</li> <li>(3)</li> <li>(4)</li> <li>(5)</li> <li>(6) Sketch the graph of y = f(x), showing the coordinates of each point at which the graph meets the axes.</li> </ul>	(	Given that $f(x) = (x^2 - 6x)(x - 2) + 3x$ ,
b) Hence factorise f(x) completely.  (2)  c) Sketch the graph of y = f(x), showing the coordinates of each point at which the graph meets the axes.  (3)		2. 3. mai 1(v) (v 3v)(v <b>2</b> ) 1 3v,
b) Hence factorise f(x) completely.  (2) c) Sketch the graph of y = f(x), showing the coordinates of each point at which the graph meets the axes.  (3)	(	(a) express $f(x)$ in the form $x(ax^2 + bx + c)$ , where a, b and c are constants.
c) Sketch the graph of $y = f(x)$ , showing the coordinates of each point at which the graph meets the axes. (3)		(3)
c) Sketch the graph of $y = f(x)$ , showing the coordinates of each point at which the graph meets the axes. (3)		The Harrison for atomics of (1) compulately
c) Sketch the graph of $y = f(x)$ , showing the coordinates of each point at which the graph meets the axes.  (3)	(	
meets the axes.  (3)		(2)
	(	(c) Sketch the graph of $y = f(x)$ , showing the coordinates of each point at which the graph meets the axes.
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**10.** The curve C with equation y = f(x),  $x \ne 0$ , passes through the point  $(3, 7\frac{1}{2})$ .

Given that  $f'(x) = 2x + \frac{3}{x^2}$ ,

(a) find f(x).

**(5)** 

(b) Verify that f(-2) = 5.

**(1)** 

(c) Find an equation for the tangent to C at the point (-2, 5), giving your answer in the form ax + by + c = 0, where a, b and c are integers.

**(4)** 

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The line $l_1$ passes through the points $P(-1, 2)$ and $Q(11, 8)$ .	
(a) Find an equation for $l_1$ in the form $y = mx + c$ , where $m$ and $c$ are constants.	
1) Find an equation for $i_1$ in the form $y = mx + c$ , where $m$ and $c$ are constants.	. (4)
The line $l_2$ passes through the point $R(10, 0)$ and is perpendicular to $l_1$ . The lines ntersect at the point $S$ .	$s l_1$ and $l_2$
(b) Calculate the coordinates of <i>S</i> .	
	(5)
(c) Show that the length of RS is $3\sqrt{5}$ .	(2)
	(2)
(d) Hence, or otherwise, find the exact area of triangle <i>PQR</i> .	(4)

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