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 11 January 2010 – Morning

Nil

Items included with question papers

Time: 1 hour 30 minutes

Materials required for examination

Mathematical Formulae (Pink or

Green)

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 to 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 10 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.

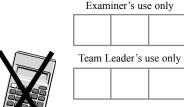
#### **Advice to Candidates**

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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Question Number	Leave Blank
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2	
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Given that $y = x^4 + x^{\frac{1}{3}} + 3$ , find $\frac{dy}{dx}$ .	(3)



(a) Expand and simplify $(7 + \sqrt{5})(3 - \sqrt{5})$ .	(3)
(b) Express $\frac{7+\sqrt{5}}{3+\sqrt{5}}$ in the form $a+b\sqrt{5}$ , where a and b are integers.	(3)

3

<ul> <li>(a) Find the gradient of l<sub>1</sub>.</li> <li>(2)</li> <li>The line l<sub>2</sub> is perpendicular to l<sub>1</sub> and passes through the point (3, 1).</li> <li>(b) Find the equation of l<sub>2</sub> in the form y = mx + c, where m and c are constants.</li> </ul>	The line I has a westion 200 500 200	
<ul> <li>(2) The line l<sub>2</sub> is perpendicular to l<sub>1</sub> and passes through the point (3, 1).</li> <li>(b) Find the equation of l<sub>2</sub> in the form y = mx + c, where m and c are constants.</li> </ul>	The line $l_1$ has equation $3x + 5y - 2 = 0$	
The line $l_2$ is perpendicular to $l_1$ and passes through the point $(3, 1)$ . (b) Find the equation of $l_2$ in the form $y = mx + c$ , where $m$ and $c$ are constants.	(a) Find the gradient of $l_1$ .	(2)
(b) Find the equation of $l_2$ in the form $y = mx + c$ , where $m$ and $c$ are constants.		(2)
	The line $l_2$ is perpendicular to $l_1$ and passes through the point $(3, 1)$ .	
	(b) Find the equation of $l_x$ in the form $v = mx + c$ where $m$ and $c$ are constants	
	(b) That the equation of $v_2$ in the form $y = mx + e$ , where $m$ and $e$ are constants.	(3)

Question 3 continued	Leave blank
	Q3
(Total 5 marks)	

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Given that $y = 35$	5 at $x = 4$ , find $y$ in ter	rms of x, giving	each term in its	simplest form. (7)

Question 4 continued	Leave blank	
	<b>Q4</b>	
(Total 7 marks)		

Solve the simultaneous equations	
y - 3x + 2 = 0	
$y^2 - x - 6x^2 = 0$	
	(7)

Question 5 continued	Leave blank
	Q5
(Total 7 marks)	

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6.	The	curve	$\overline{C}$	has	eaua	atio
•	1110	carve	$\sim$	Hub	cque	11101

$$y = \frac{(x+3)(x-8)}{x}$$
 ,  $x > 0$ 

y =  $\frac{(x+3)(x-8)}{x}$ , x > 0(a) Find  $\frac{dy}{dx}$  in its simplest form.

**(4)** 

(b) I	∃ind an a	equation	of the	tangent to	o <i>C</i> a	t the	noint	where ·	r = 2
(v) 1	illu ali	equation	or the	tangent t	$0  \mathrm{C}  a$	it the	pomi	where.	ι – 4

(4)

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Question 6 continued	Le bl
	Q6
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7.	Jill gave money to a charity over a 20-year period, from Year 1 to Year 20 inclusive. She gave £150 in Year 1, £160 in Year 2, £170 in Year 3, and so on, so that the amounts of money she gave each year formed an arithmetic sequence.	
	(a) Find the amount of money she gave in Year 10.	
	(2)	
	(b) Calculate the total amount of money she gave over the 20-year period. (3)	
	Kevin also gave money to the charity over the same 20-year period.	
	He gave $\pounds A$ in Year 1 and the amounts of money he gave each year increased, forming an arithmetic sequence with common difference $\pounds 30$ . The total amount of money that Kevin gave over the 20-year period was <b>twice</b> the total amount of money that Jill gave.	
	(c) Calculate the value of $A$ . (4)	

Question 7 continued	Leave blank

Question 7 continued	
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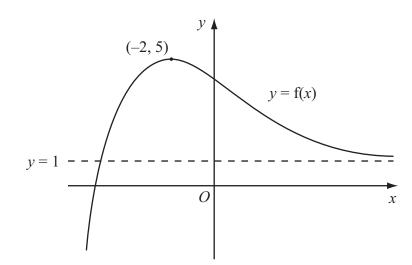


Figure 1

Figure 1 shows a sketch of part of the curve with equation y = f(x).

The curve has a maximum point (-2, 5) and an asymptote y = 1, as shown in Figure 1.

On separate diagrams, sketch the curve with equation

(a) 
$$y = f(x) + 2$$
 (2)

(b) 
$$y = 4f(x)$$
 (2)

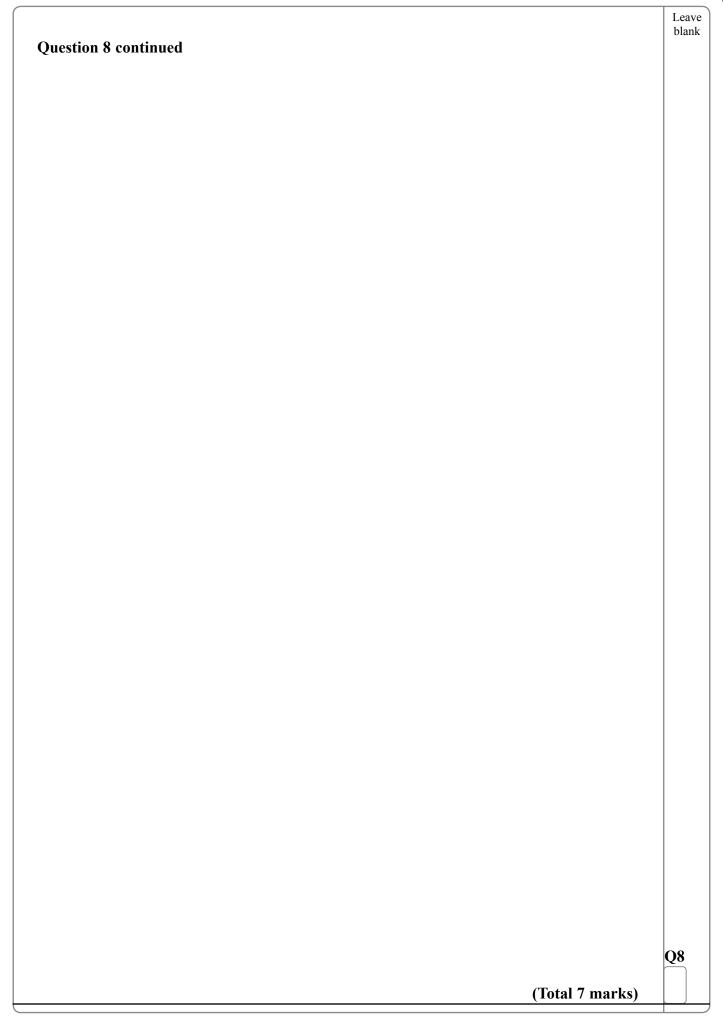
(c) 
$$y = f(x+1)$$
 (3)

On each diagram, show clearly the coordinates of the maximum point and the equation of the asymptote.

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Question 8 continued	Leave blank



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Δ .	(a) Factoria comulatela 3 4	
9. (	(a) Factorise completely $x^3 - 4x$	(3)
(	(b) Sketch the curve C with equation	
	$y = x^3 - 4x,$	
	showing the coordinates of the points at which the curve meets the <i>x</i> -axis.	
		(3)
-	The point $A$ with $x$ -coordinate $-1$ and the point $B$ with $x$ -coordinate $3$ lie on the curve	C.
(	(c) Find an equation of the line which passes through $A$ and $B$ , giving your answer in	the
	form $y = mx + c$ , where m and c are constants.	(5)
(	(d) Show that the length of AB is $k\sqrt{10}$ , where k is a constant to be found.	
		(2)
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Question 9 continued	
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Question 9 continued	

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10.	$f(x) = x^2 + 4kx + (3+11k),$	where $k$ is a constant.	
(a) Express of k.	s $f(x)$ in the form $(x+p)^2 + q$ , where	e $p$ and $q$ are constants to be found in terms	
or w.		(3)	
Given that t	the equation $f(x) = 0$ has no real roo	ots,	
(b) find the	e set of possible values of $k$ .	(4)	
Given that k	x=1,		
	the graph of $y = f(x)$ , showing the case a coordinate axis.	coordinates of any point at which the graph	
		(3)	

Question 10 continued	Leave blank

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Question 10 continued	bla
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(Total 10 marks)  TOTAL FOR PAPER: 75 MARKS	
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