Paper Reference (complete below)  Centre No.  Surname		Initia	al(s)
6663/01 Candidate No. Signature			
Paper Reference(s)	Examiner'	s use	only
6663			
Edexcel GCE	Team Leade	r's us	se only
Core Mathematics C1			
Advanced Subsidiary	Ques Num		Leave Blank
Mock Paper	1		
	2	2	
Time: 1 hour 30 minutes	3	\$	
	4		
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Materials required for examination Mathematical Formulae  Materials required for examination Nil	7		
Widthenfatical Formulae 14th	8		
Calculators may NOT be used in this examination.	9		
Calculators may 1001 be used in this examination.	1	0	
<u>Instructions to Candidates</u>		_	
In the boxes above, write your centre number, candidate number, your surname, initials and signature. You must write your answer for each question in the space following the question. If you need more space to complete your answer to any question, use additional answer sheets.		<u>-</u>	
Information for Candidates		$\frac{1}{2}$	
A booklet 'Mathematical Formulae and Statistical Tables' is provided.			
Full marks may be obtained for answers to ALL questions.  This paper has ten questions.		$\dashv$	

## **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

Total



		Leav blank
1.	Solve the inequality	
	$10+x^2>x(x-2).$	
	(3)	

2.	Find $\int \left(x^2 - \frac{1}{x^2} + \sqrt[3]{x}\right) dx.$	Leave blank
	(4)	

			Leave blank
3.	Find the value of		
	(a) $81^{\frac{1}{2}}$ ,		
		(1)	
	(b) $81^{\frac{3}{4}}$ ,		
		(2)	
	(c) $81^{-\frac{3}{4}}$ .	(4)	
		(1)	

4.	A sequence $a_1, a_2, a_3,$ is defined by	Leave blank
	$a_1 = k$ , $a_{n+1} = 4 a_n - 7$ ,	
	where $k$ is a constant.	
	(a) Write down an expression for $a_2$ in terms of $k$ . (1)	
	(b) Find $a_3$ in terms of $k$ , simplifying your answer.	
	Given that $a_3 = 13$ ,	
	(c) find the value of $k$ . (2)	

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5.	(a)	Show that eliminating <i>y</i> from the equations	Ounc
		2x + y = 8,	
		$3x^2 + xy = 1$	
		produces the equation	
		$x^2 + 8x - 1 = 0.  (2)$	
	(b)	Hence solve the simultaneous equations	
		2x + y = 8,	
		$3x^2 + xy = 1$	
		giving your answers in the form $a + b\sqrt{17}$ , where a and b are integers. (5)	

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5.	continued	

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6.	$f(x) = \frac{(2x+1)(x+4)}{\sqrt{x}},  x > 0.$	
	(a) Show that $f(x)$ can be written in the form $Px^{\frac{3}{2}} + Qx^{\frac{1}{2}} + Rx^{-\frac{1}{2}}$ , stating the values of constants $P$ , $Q$ and $R$ .	
	(b) Find f '(x).	(3)
	(c) Show that the tangent to the curve with equation $y = f(x)$ at the point where $x = $ parallel to the line with equation $2y = 11x + 3$ .	1 is (3)

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-		blank
6.	continued	

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7.	(a)	Factorise completely $x^3 - 4x$ . (3)	
	(b)	Sketch the curve with equation $y = x^3 - 4x$ , showing the coordinates of the points where the curve crosses the x-axis.	
		(3)	
	(c)	On a separate diagram, sketch the curve with equation	
		$y = (x-1)^3 - 4(x-1),$	
		showing the coordinates of the points where the curve crosses the $x$ -axis. (3)	

7.	continued	Leave blank
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8.	The straight line $l_1$ has equation $y = 3x - 6$ .	
	The straight line $l_2$ is perpendicular to $l_1$ and passes through the point $(6, 2)$ .	
	(a) Find an equation for $l_2$ in the form $y = mx + c$ , where $m$ and $c$ are constants.	(3)
	The lines $l_1$ and $l_2$ intersect at the point $C$ .	
	(b) Use algebra to find the coordinates of C.	(3)
	The lines $l_1$ and $l_2$ cross the x-axis at the points A and B respectively.	(3)
	(c) Calculate the exact area of triangle ABC.	(4)

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8.		
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4	An arithmetic series has first term $a$ and common difference $d$ .	
	(a) Prove that the sum of the first <i>n</i> terms of the series is	
	$\frac{1}{2}n[2a+(n-1)d].$	
	-	4)
	A polygon has 16 sides. The lengths of the sides of the polygon, starting with the shortest sides form an arithmetic sequence with common difference $d$ cm.	le,
	The longest side of the polygon has length 6 cm and the perimeter of the polygon is 72 cm.	
	Find	
	(b) the length of the shortest side of the polygon,	· <b>-</b> \
	(c) the value of d.	(5)
		2)
-		
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		blank
9.	continued	

For the curve $C$ with equation $y = f(x)$ ,
i of the curve of with equation y (w),
$\frac{\mathrm{d}y}{\mathrm{d}x} = x^3 + 2x - 7.$
(a) Find $\frac{d^2y}{dx^2}$ .
(2)
(b) Show that $\frac{d^2 y}{dx^2} \ge 2$ for all values of $x$ .
(1)
Given that the point $P(2, 4)$ lies on $C$ ,
(c) find $y$ in terms of $x$ , (5)
(d) find an equation for the normal to $C$ at $P$ in the form $ax + by + c = 0$ , where $a$ , $b$ and $c$ are integers.
(5)

10.	continued	Leave blank
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