FOR EDEXCEL

GCE Examinations
Advanced Subsidiary

Core Mathematics C1

Paper I

MARKING GUIDE

This guide is intended to be as helpful as possible to teachers by providing concise solutions and indicating how marks could be awarded. There are obviously alternative methods that would also gain full marks.

Method marks (M) are awarded for knowing and using a method.

Accuracy marks (A) can only be awarded when a correct method has been used.

(B) marks are independent of method marks.

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C1 Paper I – Marking Guide

1. $u_k = k^2 - 6k + 11 = 38$

$\therefore\ k^2 - 6k - 27 = 0$ M1

$(k + 3)(k - 9) = 0$ M1

$k \geq 1\ \ \therefore\ k = 9$ A1 **(3)**

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2. $= \frac{4}{3}x^3 - \frac{2}{3}x^{\frac{3}{2}} + c$ M1 A2 **(3)**

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3. $4\sqrt{12} - \sqrt{75} = 4(2\sqrt{3}) - 5\sqrt{3} = 3\sqrt{3}$ M1 A1

$= \sqrt{9 \times 3} = \sqrt{27}$, $\quad n = 27$ M1 A1 **(4)**

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4. *(a)* $= (6 + \sqrt[4]{16})^{\frac{1}{3}}$ B1 M1

$= (6 + 2)^{\frac{1}{3}} = \sqrt[3]{8} = 2$ A1

(b) $\frac{3}{\sqrt{x}} = 4$ M1

$\sqrt{x} = \frac{3}{4}$ M1

$x = \frac{9}{16}$ A1 **(6)**

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5. *(a)* $f(x) = \int (-\frac{1}{x^2})\ dx$

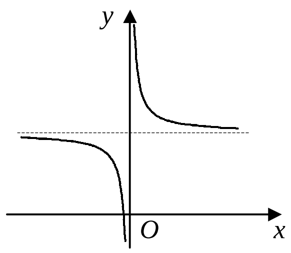
$f(x) = x^{-1} + c$ M1 A1

$(-1, 3)\ \ \therefore\ 3 = -1 + c$

$c = 4$ M1

$f(x) = x^{-1} + 4$ A1

(b)



B2

asymptotes: $x = 0$ and $y = 4$ B1 **(7)**

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6. *(a)* $f(x) = (x - 5)^2 - 25 + 17$ M1

$f(x) = (x - 5)^2 - 8$ A2

(b) $(5, -8)$ B1

(c) *(i)* $(5, -4)$ B2

(ii) $(\frac{5}{2}, -8)$ B2 **(8)**

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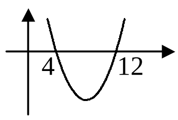
7. *(a)* real roots $\therefore\ b^2 - 4ac \geq 0$

$(-k)^2 - [4 \times 4 \times (k - 3)] \geq 0$ M1

$k^2 - 16k + 48 \geq 0$ A1

(b) $(k - 4)(k - 12) \geq 0$ M1



M1

$k \leq 4$ or $k \geq 12$ A1

(c) $k = 4$ B1

$4x^2 - 4x + 1 = 0$

$(2x - 1)^2 = 0$ M1

$x = \frac{1}{2}$ A1 **(8)**

8.	*(a)*	*(i)*	$a = 3,\ a + 2d = 27$	B1	
			$2d = 24,\ d = 12$	M1 A1	
		(ii)	$= \frac{11}{2}[6 + (10 \times 12)]$	M1	
			$= \frac{11}{2} \times 126 = 693$	A1	
	(b)		$a = 56,\ l = 144$	B1	
			$56 + 8(n - 1) = 144,\ n = 12$	M1 A1	
			$S_{12} = \frac{12}{2}(56 + 144) = 6 \times 200 = 1200$	M1 A1	**(10)**

9.	*(a)*	$x^3 - 5x^2 + 7x = 0$		
		$x(x^2 - 5x + 7) = 0$	M1	
		$x = 0$ or $x^2 - 5x + 7 = 0$		
		$b^2 - 4ac = (-5)^2 - (4 \times 1 \times 7) = -3$	M1	
		$b^2 - 4ac < 0 \ \therefore$ no real roots	A1	
		$\therefore$ only crosses x-axis at one point	A1	
	(b)	$\frac{dy}{dx} = 3x^2 - 10x + 7$	M1 A1	
		grad of tangent $= 27 - 30 + 7 = 4$		
		grad of normal $= \frac{-1}{4} = -\frac{1}{4}$	M1 A1	
		$\therefore\ y - 3 = -\frac{1}{4}(x - 3)$	M1	
		$4y - 12 = -x + 3$		
		$x + 4y = 15$	A1	
	(c)	$x = 0 \Rightarrow y = \frac{15}{4}$		
		$y = 0 \Rightarrow x = 15$	M1	
		area $= \frac{1}{2} \times \frac{15}{4} \times 15 = \frac{225}{8} = 28\frac{1}{8}$	M1 A1	**(13)**

10.	*(a)*	grad $= \frac{4-3}{3-(-1)} = \frac{1}{4}$	M1 A1	
		$\therefore\ y - 3 = \frac{1}{4}(x + 1)$	M1	
		$4y - 12 = x + 1$		
		$x - 4y + 13 = 0$	A1	
	(b)	perp grad $= \frac{-1}{\frac{1}{4}} = -4$	M1	
		line through A, perp l_1: $y - 3 = -4(x + 1)$	M1	
		$y = -4x - 1$	A1	
		intersection with l_2: $x - 4(-4x - 1) - 21 = 0$		
		$x = 1,\ \therefore (1, -5)$	M1 A1	
		dist. A to $(1, -5) = \sqrt{(1+1)^2 + (-5-3)^2} = \sqrt{4+64} = \sqrt{68}$	M1	
		$\therefore$ dist. between lines $= \sqrt{68} = \sqrt{4 \times 17} = 2\sqrt{17}$ $[\ k = 2\ ]$	A1	
	(c)	$AB = \sqrt{(3+1)^2 + (4-3)^2} = \sqrt{16+1} = \sqrt{17}$	M1	
		area $= \sqrt{17} \times 2\sqrt{17} = 34$	A1	**(13)**

Total **(75)**

Performance Record – C1 Paper I

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	Total
Topic(s)	sequence	integr.	surds	indices	integr.	compl. square, transform.	roots, inequal.	AP	diff., normal	straight lines	
Marks	3	3	4	6	7	8	8	10	13	13	75
Student											