FOR EDEXCEL

GCE Examinations
Advanced Subsidiary

Core Mathematics C1

Paper A

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.

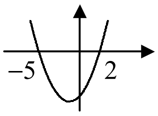
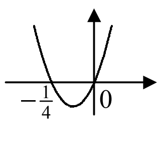
Accuracy marks (A) can only be awarded when a correct method has been used.

(B) marks are independent of method marks.

Solomon Press

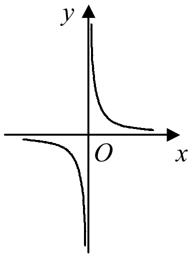
Written by Shaun Armstrong

C1 Paper A – Marking Guide

1.	*(a)*	$= \frac{21}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = 3\sqrt{7}$	M1 A1	
	(b)	$= \frac{1}{\sqrt[3]{8}} = \frac{1}{2}$	M1 A1	**(4)**
2.		AP: $a = 27$, $l = 67$	B1	
		$n = 30 - 9 = 21$	B1	
		$S_{21} = \frac{21}{2}(27 + 67)$	M1	
		$= \frac{21}{2} \times 94 = 987$	A1	**(4)**
3.		$\frac{6x^2 - 1}{2\sqrt{x}} = 3x^{\frac{3}{2}} - \frac{1}{2}x^{-\frac{1}{2}}$	M1 A1	
		$\frac{\mathrm{d}}{\mathrm{d}x}(3x^{\frac{3}{2}} - \frac{1}{2}x^{-\frac{1}{2}}) = \frac{9}{2}x^{\frac{1}{2}} + \frac{1}{4}x^{-\frac{3}{2}}$	M1 A2	**(5)**
4.	*(a)*	$x^2 + 3x - 10 > 0$		
		$(x + 5)(x - 2) > 0$ 	M1	
			M1	
		$x < -5$ or $x > 2$	A1	
	(b)	$3x - 2 < x + 3 \Rightarrow 2x < 5$	M1	
		$x < \frac{5}{2}$	A1	
		both satisfied when $x < -5$ or $2 < x < \frac{5}{2}$	A1	**(6)**
5.	*(a)*	$u_2 = k^2 - 1$	B1	
		$u_3 = (k^2 - 1)^2 - 1 = k^4 - 2k^2$	M1 A1	
	(b)	$k^4 - 2k^2 + k^2 - 1 = 11$		
		$k^4 - k^2 - 12 = 0$	M1	
		$(k^2 + 3)(k^2 - 4) = 0$	M1	
		$k^2 = -3$ (no solutions) or 4	A1	
		$k = \pm 2$	A1	**(7)**
6.	*(a)*	$(x + 2k)^2 - (2k)^2 - k = 0$	M1	
		$(x + 2k)^2 = 4k^2 + k$	A1	
		$x + 2k = \pm\sqrt{4k^2 + k}$	M1	
		$x = -2k \pm \sqrt{4k^2 + k}$	A1	
	(b)	no real roots if $4k^2 + k < 0$	M1	
		$k(4k + 1) < 0$, critical values: $-\frac{1}{4}, 0$ 	A1	
			M1	
		$\therefore -\frac{1}{4} < k < 0$	A1	**(8)**

7. *(a)* stretch by factor of 3 in y-direction about x-axis — B2
or stretch by factor of 3 in x-direction about y-axis

(b)



B2
asymptotes: $x = 0$ and $y = 0$ — B1

(c) $\frac{3}{x} = c - 3x$
$3 = cx - 3x^2$ — M1
$3x^2 - cx + 3 = 0$
tangent $\therefore$ equal roots, $b^2 - 4ac = 0$
$(-c)^2 - (4 \times 3 \times 3) = 0$ — M1 A1
$c^2 = 36, \quad c = \pm 6$ — A1 **(9)**

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8. *(a)* grad $= \frac{7-4}{9-7} = \frac{3}{2}$ — M1 A1
$\therefore \; y - 4 = \frac{3}{2}(x - 7)$ — M1
$2y - 8 = 3x - 21$
$3x - 2y - 13 = 0$ — A1

(b) $y = 8x$ — B1

(c) at R, $3x - 2(8x) - 13 = 0$
$x = -1 \quad \therefore R\,(-1, -8)$ — M1 A1
$OP = \sqrt{7^2 + 4^2} = \sqrt{49+16} = \sqrt{65}$ — M1 A1
$OR = \sqrt{(-1)^2 + (-8)^2} = \sqrt{1+64} = \sqrt{65} \quad \therefore OP = OR$ — A1 **(10)**

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9. *(a)* $y = \int (6 - 4x - 3x^2)\,dx, \quad y = 6x - 2x^2 - x^3 + c$ — M1 A2
$(0, 0) \;\therefore c = 0$ — M1
$y = 6x - 2x^2 - x^3$ — A1

(b) $6x - 2x^2 - x^3 = 0, \quad x(6 - 2x - x^2) = 0$ — M1
$x = 0$ (at O) or $6 - 2x - x^2 = 0$
at A, B: $x = \frac{2 \pm \sqrt{4+24}}{-2} = \frac{2 \pm 2\sqrt{7}}{-2} = -1 \pm \sqrt{7}$ — M2 A1
$A\,(-1 - \sqrt{7}, 0)$, $B\,(-1 + \sqrt{7}, 0)$
$\therefore \; AB = (-1 + \sqrt{7}) - (-1 - \sqrt{7}) = 2\sqrt{7} \qquad [\, k = 2 \,]$ — M1 A1 **(11)**

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10. *(a)* $\frac{dy}{dx} = 1 - 3x^{-2}$ — M1 A1
grad $= 1 - 3(1)^{-2} = 1 - 3 = -2$ — A1

(b) $x = 1 \;\therefore y = 4$
grad $= \frac{-1}{-2} = \frac{1}{2}$ — M1 A1
$\therefore \; y - 4 = \frac{1}{2}(x - 1)$ — M1
$y = \frac{1}{2}x + \frac{7}{2}$ — A1

(c) $x + \frac{3}{x} = \frac{1}{2}x + \frac{7}{2}$
$2x^2 + 6 = x^2 + 7x$ — M1
$x^2 - 7x + 6 = 0, \quad (x - 1)(x - 6) = 0$ — M1
$x = 1$ (at P), 6 — A1
$\therefore \; (6, \; 6\frac{1}{2})$ — A1 **(11)**

Total **(75)**

Performance Record – C1 Paper A

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	Total
Topic(s)	surds, indices	AP	diff.	inequals	recur. relation	compl. square	transform., rep. root	straight lines	integr.	diff., normal	
Marks	4	4	5	6	7	8	9	10	11	11	75
Student											