FOR EDEXCEL

GCE Examinations
Advanced Subsidiary

Core Mathematics C1

Paper K

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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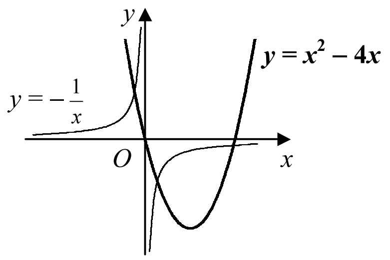
C1 Paper K – Marking Guide

1.		$(2^2)^{y+3} = 2^3$	M1	
		$2y + 6 = 3$	M1	
		$y = -\frac{3}{2}$	A1	**(3)**
2.		$= \int (3x^2 + \frac{1}{2}x^{-2})\ dx$	B1	
		$= x^3 - \frac{1}{2}x^{-1} + c$	M1 A2	**(4)**
3.		$\frac{EH}{AD} = \frac{EF}{AB} \quad \therefore \quad \frac{EH}{\sqrt{5}} = \frac{1+\sqrt{5}}{3-\sqrt{5}}$	M1	
		$\frac{1+\sqrt{5}}{3-\sqrt{5}} = \frac{1+\sqrt{5}}{3-\sqrt{5}} \times \frac{3+\sqrt{5}}{3+\sqrt{5}} = \frac{3+\sqrt{5}+3\sqrt{5}+5}{9-5} = 2 + \sqrt{5}$	M2 A1	
		$\therefore EH = \sqrt{5}(2 + \sqrt{5}) = 5 + 2\sqrt{5}$	M1 A1	**(6)**
4.	*(a)*		B2 B2	
	(b)	3 solutions	B1	
		$x^2 - 4x + \frac{1}{x} = 0 \Rightarrow x^2 - 4x = -\frac{1}{x}$		
		and the graphs of $y = x^2 - 4x$ and $y = -\frac{1}{x}$ intersect at 3 points	B1	**(6)**
5.	*(a)*	$(x + k)^2 - k^2 + 4 = 0$	M1	
		$(x + k)^2 = k^2 - 4$	A1	
		$x + k = \pm\sqrt{k^2 - 4}$	M1	
		$x = -k \pm \sqrt{k^2 - 4}$	A1	
	(b)	$k = 3 \quad \therefore x = -3 \pm \sqrt{3^2 - 4}$	M1	
		$= -3 \pm \sqrt{5}$	A1	**(6)**
6.	*(a)*	AP: $a = 77, l = -70$	B1	
		$S_{50} = \frac{50}{2}[77 + (-70)] = 25 \times 7 = 175$	M1 A1	
	(b)	AP: $a = 2, d = \frac{1}{2}$	B2	
		$S_n = \frac{n}{2}[4 + \frac{1}{2}(n - 1)]$	M1	
		$= \frac{1}{4}n[8 + (n - 1)] = \frac{1}{4}n(n + 7) \qquad [\ k = \frac{1}{4}\ ]$	A1	**(7)**
7.		$x - 3y + 7 = 0 \Rightarrow x = 3y - 7$	M1	
		sub. into $x^2 + 2xy - y^2 = 7$		
		$(3y - 7)^2 + 2y(3y - 7) - y^2 = 7$	M1	
		$y^2 - 4y + 3 = 0$	A1	
		$(y - 1)(y - 3) = 0$	M1	
		$y = 1, 3$	A1	
		$\therefore x = -4, y = 1$ or $x = 2, y = 3$	M1 A1	**(7)**

8. *(a)*	$\frac{dy}{dx} = 1 - 4x^{-3}$	B1	
	$\frac{d^2y}{dx^2} = 12x^{-4}$	M1 A1	
(b)	$y = \int (1 - 4x^{-3})\ dx$		
	$y = x + 2x^{-2} + c$	M1 A2	
	$x = -1, y = 0 \quad \therefore \quad 0 = -1 + 2 + c$		
	$c = -1$	M1	
	$y = x + 2x^{-2} - 1$		
	when $x = 2, \quad y = 2 + \frac{1}{2} - 1 = \frac{3}{2}$	M1 A1	**(9)**

9. *(a)*	$y = x - 6\sqrt{x} + 9$	M1 A1	
	$\frac{dy}{dx} = 1 - 3x^{-\frac{1}{2}} = 1 - \frac{3}{\sqrt{x}}$	M1 A1	
(b)	$x = 4 \quad \therefore y = 1$		
	grad of tangent $= 1 - \frac{3}{2} = -\frac{1}{2}$	M1	
	grad of normal $= \frac{-1}{-\frac{1}{2}} = 2$	M1 A1	
	$\therefore \quad y - 1 = 2(x - 4)$	M1	
	$y = 2x - 7$	A1	
(c)	at intersect: $x - 6\sqrt{x} + 9 = 2x - 7$		
	$x + 6\sqrt{x} - 16 = 0$	M1	
	$(\sqrt{x} + 8)(\sqrt{x} - 2) = 0$	M1	
	$\sqrt{x} = -8, 2$	A1	
	$\sqrt{x} = 2 \Rightarrow x = 4$ (at P)		
	$\sqrt{x} = -8 \Rightarrow$ no real solutions $\therefore$ normal does not intersect again	A1	**(13)**

10. *(a)*	$y - 4 = 3(x + 6)$	M1	
	$y = 3x + 22$	A1	
(b)	at B, $\quad x = 0 \quad \therefore y = 2 \quad \Rightarrow \quad B\ (0, 2)$	B1	
	at C, $\quad x - 7(3x + 22) + 14 = 0$	M1	
	$x = -7$	A1	
	$\therefore \quad C\ (-7, 1)$	A1	
(c)	grad $AB = \frac{2-4}{0-(-6)} = -\frac{1}{3}$	M1 A1	
	grad $AC = \frac{1-4}{-7-(-6)} = 3$		
	grad $AB \times$ grad $AC = -\frac{1}{3} \times 3 = -1$	M1	
	$\therefore \quad AB$ perp to $AC \quad \therefore \angle BAC = 90°$	A1	
(d)	$AB = \sqrt{(0+6)^2 + (2-4)^2} = \sqrt{36+4} = \sqrt{40} = 2\sqrt{10}$	M1 A1	
	$AC = \sqrt{(-7+6)^2 + (1-4)^2} = \sqrt{1+9} = \sqrt{10}$		
	area $= \frac{1}{2} \times 2\sqrt{10} \times \sqrt{10} = 10$	M1 A1	**(14)**

Total **(75)**

Performance Record – C1 Paper K

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	Total
Topic(s)	indices	integr.	surds	curve sketch	compl. square	AP	simul. eqn	diff., integr.	diff., normal	straight lines	
Marks	3	4	6	6	6	7	7	9	13	14	75
Student											