FOR EDEXCEL

GCE Examinations
Advanced Subsidiary

Core Mathematics C2

Paper H

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

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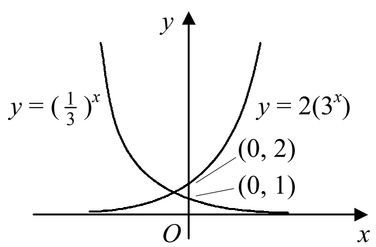
C2 Paper H – Marking Guide

1.	*(a)*	$x^2 + (y-3)^2 - 9 - 7 = 0$	M1	
		$\therefore$ centre $(0, 3)$	A1	
	(b)	$x^2 + (y-3)^2 = 16$	M1	
		$\therefore$ radius $= 4$	A1	**(4)**
2.	*(a)*	$P = 2r + (r \times 2.5) = \frac{9}{2}r = 36$	M1	
		$OA = r = 8$ cm	A1	
	(b)	$= (\frac{1}{2} \times 8^2 \times 2.5) - (\frac{1}{2} \times 8^2 \times \sin 2.5) = 60.8\text{ cm}^2$ (3sf)	M2 A1	**(5)**
3.	*(a)*	$7 - 2x - 3x^2 = \frac{2}{x}, \quad 7x - 2x^2 - 3x^3 = 2$	M1	
		$3x^3 + 2x^2 - 7x + 2 = 0$	A1	
	(b)	$x = -2$ is a solution $\therefore (x+2)$ is a factor	B1	
		$$\begin{array}{r\|rrrr} & 3x^2 & -\;4x & +\;1 & \\ \hline x+2 & 3x^3 & +\;2x^2 & -\;7x & +\;2 \\ & 3x^3 & +\;6x^2 & & \\ \hline & & -\;4x^2 & -\;7x & \\ & & -\;4x^2 & -\;8x & \\ \hline & & & x & +\;2 \\ & & & x & +\;2 \\ \hline \end{array}$$	M1 A1	
		$\therefore (x+2)(3x^2 - 4x + 1) = 0$		
		$(x+2)(3x-1)(x-1) = 0$	M1	
		$x = -2$ (at P), $\frac{1}{3}$, $1 \quad \therefore (\frac{1}{3}, 6), (1, 2)$	A2	**(8)**
4.	*(a)*	$= 1 + 4x + 6x^2 + 4x^3 + x^4$	M1 A1	
	(b) *(i)*	$= 1 + 4(\sqrt{2}) + 6(\sqrt{2})^2 + 4(\sqrt{2})^3 + (\sqrt{2})^4$	M1	
		$= 1 + 4\sqrt{2} + 6(2) + 4(2\sqrt{2}) + 4$	M1	
		$= 17 + 12\sqrt{2}$	A1	
	(ii)	$(1 - \sqrt{2})^4 = 17 - 12\sqrt{2}$	B1	
		$(1 - \sqrt{2})^8 = [(1 - \sqrt{2})^4]^2 = (17 - 12\sqrt{2})^2$	M1	
		$= 289 - 408\sqrt{2} + 288$	M1	
		$= 577 - 408\sqrt{2}$	A1	**(9)**
5.	*(a)*	reflection in the y-axis	B1	
	(b)		B3	
	(c)	$(\frac{1}{3})^x = 2(3^x)$		
		$1 = 2 \times (3^x)^2$	M1	
		$3^{2x} = \frac{1}{2}, \quad 2x = \frac{\lg \frac{1}{2}}{\lg 3}$	M1	
		$x = \frac{\lg \frac{1}{2}}{2 \lg 3} = -0.32$	A1	
		$3^x = \sqrt{\frac{1}{2}} = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{1}{2}\sqrt{2}$	M1	
		$y = 2(3^x) = 2 \times \frac{1}{2}\sqrt{2} = \sqrt{2}$	A1	**(9)**

6. (a)	$\frac{dy}{dx} = 3x^2 + 2ax - 15$	M1 A1	
	SP when $x = -1$ $\therefore$ $3 - 2a - 15 = 0$	M1	
	$a = -6$	A1	
	$y = x^3 - 6x^2 - 15x + b$		
	$(-1, 12)$ on curve $\therefore$ $12 = -1 - 6 + 15 + b$	M1	
	$b = 4$	A1	
(b)	$3x^2 - 12x - 15 = 0$	M1	
	$3(x - 5)(x + 1) = 0$	M1	
	$x = -1$ [at $(-1, 12)$] or 5		
	$\therefore$ $(5, -96)$	A1	**(9)**

7. (a)	$\frac{1-8x^3}{x^2} = 0 \Rightarrow 1 - 8x^3 = 0$	M1	
	$x^3 = \frac{1}{8}$		
	$x = \frac{1}{2}$	M1 A1	
(b)	$f(x) = x^{-2} - 8x$		
	$\int f(x)\ dx = \int (x^{-2} - 8x)\ dx$		
	$= -x^{-1} - 4x^2 + c$	M1 A2	
(c)	$= -[-x^{-1} - 4x^2]_{\frac{1}{2}}^{2}$	M1	
	$= -\{(-\frac{1}{2} - 16) - (-2 - 1)\} = 13\frac{1}{2}$	M1 A1	**(9)**

8. (a)	$\sin^2\theta = (2 - \sqrt{2})^2 = 4 - 4\sqrt{2} + 2 = 6 - 4\sqrt{2}$	M1	
	$\cos^2\theta = 1 - (6 - 4\sqrt{2}) = -5 + 4\sqrt{2}$	M1 A1	
(b)	$2x - \frac{\pi}{6} = \frac{\pi}{3}, 2\pi - \frac{\pi}{3} = \frac{\pi}{3}, \frac{5\pi}{3}$	B1 M1	
	$2x = \frac{\pi}{2}, \frac{11\pi}{6}$	M1 A1	
	$x = \frac{\pi}{4}, \frac{11\pi}{12}$	M1 A2	**(10)**

9. (a)	$ar = -48,\ ar^4 = 6$	B1	
	$r^3 = \frac{6}{-48} = -\frac{1}{8}$	M1	
	$r = \sqrt[3]{-\frac{1}{8}} = -\frac{1}{2}$	M1 A1	
	$a = \frac{-48}{-\frac{1}{2}} = 96$	A1	
(b)	$= \frac{96}{1-(-\frac{1}{2})} = 64$	M1 A1	
(c)	$S_n = \frac{96[1-(-\frac{1}{2})^n]}{1-(-\frac{1}{2})} = 64[1 - (-\frac{1}{2})^n]$	M1 A1	
	$S_\infty - S_n = 64 - 64[1 - (-\frac{1}{2})^n]$	M1	
	$= 64(-\frac{1}{2})^n = 2^6 \times (-1)^n \times 2^{-n} = (-1)^n \times 2^{6-n}$	M1	
	difference is magnitude, $\therefore = 2^{6-n}$	A1	**(12)**

Total **(75)**

Performance Record – C2 Paper H

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Total
Topic(s)	circle	sector of a circle	factor theorem, alg. div.	binomial	exponential graphs, logs	SP	area by integr.	trig. eqn	GP	
Marks	4	5	8	9	9	9	9	10	12	75
Student										