FOR OCR

GCE Examinations

Advanced / Advanced Subsidiary

Core Mathematics C2

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 using a valid 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 I – Marking Guide

1. *(i)* $u_1 = 2 + k$

$u_3 = 8 + 3k$ — B1

$u_1 = u_3 \ \therefore\ 2 + k = 8 + 3k$ — M1

$k = -3$ — A1

(ii) $u_5 = 2^5 - 3(5) = 32 - 15 = 17$ — M1 A1 **(5)**

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2. $= \int (2x^{\frac{3}{2}} - 1)^2 \ dx$

$= \int (4x^3 - 4x^{\frac{3}{2}} + 1)\ dx$ — M1 A1

$= x^4 - \frac{8}{5}x^{\frac{5}{2}} + x + c$ — M1 A3 **(6)**

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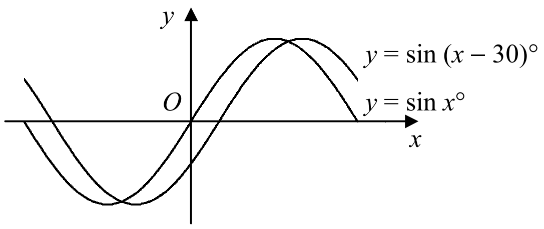
3. *(i), (ii)*



B2

B2

(iii) $x = -75, 105$ — B2 **(6)**

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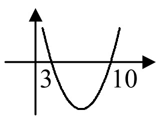
4. *(i)* $(x - 3)(x - 10) < 0$ — M1



M1

$3 < x < 10$ — A1

(ii) let $x = 2^y$

$\Rightarrow \quad 3 < 2^y < 10$

$\lg 3 < y \lg 2 < \lg 10$ — M1

$\frac{\lg 3}{\lg 2} < y < \frac{\lg 10}{\lg 2}$ — M1

$1.58 < y < 3.32$ (3sf) — A1 **(6)**

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5. *(i)* $(-4, 0) \ \therefore\ 0 = 4 - 20 + 16k + 128$ — M1

$16k = -112, \ k = -7$ — A1

(ii) $4 + 5x - 7x^2 - 2x^3 = 0$

$x = -4$ is a solution $\therefore$ $(x + 4)$ is a factor — B1

$$\begin{array}{r|l} & -2x^2 + x + 1 \\ x + 4 & -2x^3 - 7x^2 + 5x + 4 \\ & -2x^3 - 8x^2 \\ & \qquad\quad x^2 + 5x \\ & \qquad\quad x^2 + 4x \\ & \qquad\qquad\quad x + 4 \\ & \qquad\qquad\quad x + 4 \end{array}$$

M1 A1

$\therefore\ (x + 4)(1 + x - 2x^2) = 0$

$(x + 4)(1 + 2x)(1 - x) = 0$ — M1

$x = -4$ (at A), $-\frac{1}{2}$, 1

$\therefore\ (-\frac{1}{2}, 0), (1, 0)$ — A1 **(7)**

6.	*(i)*	$f(x) = \int (5 + \frac{4}{x^2})\ dx$		
		$f(x) = 5x - 4x^{-1} + c$	M1 A2	
	(ii)	$f(1) = 5 - 4 + c = 1 + c$	M1	
		$f(2) = 10 - 2 + c = 8 + c$		
		$f(2) = 2f(1) \quad \therefore \quad 8 + c = 2(1 + c)$	M1	
		$c = 6$	A1	
		$f(x) = 5x - 4x^{-1} + 6$		
		$f(4) = 20 - 1 + 6 = 25$	M1 A1	**(8)**

7.	*(i)*	$\frac{\sin B}{3} = \frac{\sin 2.2}{7}$	M1	
		$\sin B = \frac{3}{7} \sin 2.2$		
		$\angle ABC = 0.354$ (3sf)	A1	
	(ii)	$\angle BAC = \pi - (2.2 + 0.3538) = 0.588$ (3sf)	M1 A1	
	(iii)	$= \frac{1}{2} \times 3 \times 7 \times \sin 0.5878 = 5.82\text{ m}^2$ (3sf)	M1 A1	
	(iv)	$= 5.822 + [\frac{1}{2} \times 2^2 \times (2\pi - 0.5878)] + [\frac{1}{2} \times 1^2 \times (2\pi - 0.3538)]$	M3	
		$= 20.2\text{ m}^2$ (3sf)	A1	**(10)**

8.	*(i)*	x: 2, 4, 6, 8		
		$1 + 3\sqrt{x}$: 5.243, 7, 8.348, 9.485	M1 A1	
		area $\approx \frac{1}{2} \times 2 \times [5.243 + 9.485 + 2(7 + 8.348)]$	B1 M1	
		$= 45.4$ (3sf)	A1	
	(ii)	$= \int_2^8 (1 + 3\sqrt{x})\ dx$		
		$= [x + 2x^{\frac{3}{2}}]_2^8$	M1 A1	
		$= [8 + 2(2\sqrt{2})^3] - [2 + 2(2\sqrt{2})]$	M1	
		$= (8 + 32\sqrt{2}) - (2 + 4\sqrt{2})$	M1	
		$= 6 + 28\sqrt{2}$	A1	
	(iii)	$= \frac{(6+28\sqrt{2})-45.4}{6+28\sqrt{2}} \times 100\% = 0.43\%$	M1 A1	**(12)**

9.	*(i)*	$r = \frac{x}{2}$	M1	
		$\therefore \quad u_3 = x \times \frac{x}{2} = \frac{1}{2}x^2$	M1 A1	
	(ii)	$a = 2, \ a + 2d = x$		
		$\therefore \quad d = \frac{1}{2}(x - 2)$	M1	
		$u_{11} = 2 + [10 \times \frac{1}{2}(x - 2)] = 5x - 8$	M1 A1	
	(iii)	$\frac{1}{2}x^2 = 5x - 8$		
		$x^2 - 10x + 16 = 0$	M1	
		$(x - 2)(x - 8) = 0$	M1	
		$x \neq 2 \quad \therefore \quad x = 8$	A1	
	(iv)	$d = \frac{1}{2}(8 - 2) = 3$	B1	
		$S_{50} = \frac{50}{2}[4 + (49 \times 3)] = 3775$	M1 A1	**(12)**

Total **(72)**

Performance Record – C2 Paper I

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Total
Topic(s)	sequence	integr.	trig. graph, trig. eqn	logs	factor theorem, alg. div.	integr.	sine rule, sector of a circle	trapezium rule, area by integr.	GP, AP	
Marks	5	6	6	6	7	8	10	12	12	72
Student										