

C2 Paper A – Marking Guide

1.	(i)	$\frac{1}{2} \times 9.2^2 \times \angle AOB = 37.4$ $\angle AOB = 0.884$ radians (3sf)	M1 A1	
	(ii)	$= (2 \times 9.2) + (9.2 \times 0.8837)$ $= 26.5$ cm (3sf)	M1 A1	(4)
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2.	(i)	$f(-1) = 0 \therefore -1 - k - 20 = 0$ $k = -21$	M1 A1	
	(ii)	$ \begin{array}{r} x^2 - x - 20 \\ x + 1 \overline{) x^3 + 0x^2 - 21x - 20} \\ \underline{x^3 + x^2} \\ -x^2 - 21x \\ \underline{-x^2 - x} \\ -20x - 20 \\ \underline{-20x - 20} \\ 0 \end{array} $	M1 A1	
		$(x + 1)(x^2 - x - 20) = 0$ $(x + 1)(x + 4)(x - 5) = 0$ $x = -4, -1, 5$	M1 A1	(6)
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3.		$y = \int (3\sqrt{x} - x^2) dx$ $y = 2x^{\frac{3}{2}} - \frac{1}{3}x^3 + c$ $x = 1, y = \frac{2}{3} \therefore \frac{2}{3} = 2 - \frac{1}{3} + c$ $c = -1$ $y = 2x^{\frac{3}{2}} - \frac{1}{3}x^3 - 1$ when $x = 4, y = 2(\sqrt{4})^3 - \frac{1}{3}(4^3) - 1$ $y = 16 - 21\frac{1}{3} - 1 = -6\frac{1}{3}$	M1 A2 M1 A1 M1 A1	(7)
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4.	(i)	$r = \frac{27}{36} = \frac{3}{4}$	M1 A1	
	(ii)	$= 27 \times \frac{3}{4} = 20\frac{1}{4}$	M1 A1	
	(iii)	$a \times (\frac{3}{4})^2 = 36$ $a = 36 \times \frac{16}{9} = 64$ $S_{\infty} = \frac{64}{1 - \frac{3}{4}} = 256$	M1 A1 M1 A1	(8)
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5.	(i)	$\log_2(6 - x) + \log_2 x = 3$ $\log_2 [x(6 - x)] = 3$ $x(6 - x) = 2^3 = 8$ $x^2 - 6x + 8 = 0$ $(x - 2)(x - 4) = 0$ $x = 2, 4$	M1 M1 M1 A1	
	(ii)	$(n - 2) \lg 3 > 250 \lg 8$ $n > \frac{250 \lg 8}{\lg 3} + 2$ $n > 475.2$ smallest $n = 476$	M1 A1 M1 A1	(8)

6.	(i)		B2
	(ii)	$(0, 1), (\frac{\pi}{4}, 0), (\frac{3\pi}{4}, 0)$	B3
	(iii)	$\cos 2x = 0.5$ $2x = \frac{\pi}{3}, 2\pi - \frac{\pi}{3}$ $2x = \frac{\pi}{3}, \frac{5\pi}{3}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}$	B1 M1 A1 (8)
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7.	(i)	$= \frac{1}{2}x^2 + 5x + 6x^{\frac{1}{2}} + c$	M1 A3
	(ii)	$= \int_{-2}^0 (9x^2 - 6x + 1) dx$ $= [3x^3 - 3x^2 + x]_{-2}^0$ $= (0) - (-24 - 12 - 2) = 38$	M1 M1 A1 M1 A1 (9)
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8.	(a)	(i) $\frac{20}{2} [2a + (19 \times 7)] = 530$ $2a + 133 = 53, a = -40$	M1 M1 A1
	(ii)	$= -40 + 7k = -40 + 42 = 2$	M1 A1
	(b)	(i) $u_1 = (1 + k)^2, u_2 = (2 + k)^2$ $(2 + k)^2 = 2(1 + k)^2$ $4 + 4k + k^2 = 2 + 4k + 2k^2$ $k^2 = 2$ $k > 0 \therefore k = \sqrt{2}$	B1 M1 M1 A1
	(ii)	$u_3 = (3 + \sqrt{2})^2 = 9 + 6\sqrt{2} + 2 = 11 + 6\sqrt{2}$	M1 A1 (11)
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9.	(i)	$2x^2 + 6x + 7 = 2x + 13$ $x^2 + 2x - 3 = 0$ $(x + 3)(x - 1) = 0$ $x = -3, 1$ $\therefore (-3, 7), (1, 15)$	M1 M1 A1 A1
	(ii)	$\text{area} = \int_{-3}^1 [(2x + 13) - (2x^2 + 6x + 7)] dx$ $= \int_{-3}^1 (6 - 4x - 2x^2) dx$	M1 A1
	(iii)	$= [6x - 2x^2 - \frac{2}{3}x^3]_{-3}^1$ $= (6 - 2 - \frac{2}{3}) - (-18 - 18 + 18) = 21\frac{1}{3}$	M1 A2 M1 A1 (11)
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Total			(72)