

GCE Examinations
Advanced Subsidiary

Core Mathematics C2

Paper G

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.



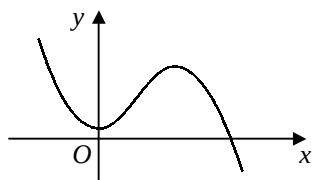
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C2 Paper G – Marking Guide

1.	$= \int_{-2}^0 (9x^2 - 6x + 1) \, dx$ $= [3x^3 - 3x^2 + x]_{-2}^0$ $= (0) - (-24 - 12 - 2) = 38$	M1 M1 A1 M1 A1	(5)
2.	(a) $f(-1) = 0 \quad \therefore -1 - k - 20 = 0$ $k = -21$ (b) $ \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} $ $(x + 1)(x^2 - x - 20) = 0$ $(x + 1)(x + 4)(x - 5) = 0$ $x = -4, -1, 5$	M1 A1 M1 A1 M1 A1	(6)
3.	(a) $5 \cos \theta = 2 \sin \theta$ $\frac{5}{2} = \frac{\sin \theta}{\cos \theta}$ $\tan \theta = 2.5$ (b) $\tan 2x = 2.5$ $2x = 68.199, 180 + 68.199$ $2x = 68.199, 248.199$ $x = 34.1, 124.1 \text{ (1dp)}$	M1 A1 B1 M1 M1 A1	(6)
4.	(a) $(x - 2) \lg 3 = \lg 5$ $x = \frac{\lg 5}{\lg 3} + 2 = 3.46 \text{ (3sf)}$ (b) $\log_2 (6 - y) + \log_2 y = 3$ $\log_2 [y(6 - y)] = 3$ $y(6 - y) = 2^3 = 8$ $y^2 - 6y + 8 = 0$ $(y - 2)(y - 4) = 0$ $y = 2, 4$	M1 M1 A1 M1 M1 M1 A1	(7)
5.	(a) $r = \frac{27}{36} = \frac{3}{4}$ (b) $= 27 \times \frac{3}{4} = 20\frac{1}{4}$ (c) $a \times \left(\frac{3}{4}\right)^2 = 36$ $a = 36 \times \frac{16}{9} = 64$ $S_{\infty} = \frac{64}{1 - \frac{3}{4}} = 256$	M1 A1 M1 A1 M1 A1 M1 A1	(8)

6.	(a)	<table><tr><td>x</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>y</td><td>2.89</td><td>6.36</td><td>11.55</td><td>18.50</td><td>27.27</td></tr></table>	x	2	3	4	5	6	y	2.89	6.36	11.55	18.50	27.27	B2	
x	2	3	4	5	6											
y	2.89	6.36	11.55	18.50	27.27											
	(b)	area $\approx \frac{1}{2} \times 1 \times [2.89 + 27.27 + 2(6.36 + 11.55 + 18.50)]$ $= 51.5$ (3sf)	B1 M1 A1 A1													
	(c)	over-estimate the curve passes below the top edge of each trapezium	B1 B1	(8)												
7.	(a)	$f'(x) = 12x - 3x^2$ for SP, $12x - 3x^2 = 0$ $3x(4 - x) = 0$ $x = 0, 4$ $\therefore (0, 2), (4, 34)$	M1 A1 M1 A2													
	(b)	$f''(x) = 12 - 6x$ $f''(0) = 12, f''(x) > 0 \therefore (0, 2)$ minimum $f''(4) = -12, f''(x) < 0 \therefore (4, 34)$ maximum	M1 A1 A1													
	(c)		B2													
	(d)	$2 < k < 34$	B1	(11)												
8.	(a)	$= \frac{-8-4}{8-2} = -2$	M1 A1													
	(b)	$= (\frac{2+8}{2}, \frac{4-8}{2}) = (5, -2)$	M1 A1													
	(c)	perp. grad $= \frac{-1}{-2} = \frac{1}{2}$ perp. bisector: $y + 2 = \frac{1}{2}(x - 5)$ centre where $y = 0 \therefore x = 9 \Rightarrow (9, 0)$	M1 M1 A1 M1 A1													
	(d)	radius = dist. $(2, 4)$ to $(9, 0) = \sqrt{49+16} = \sqrt{65}$ $\therefore (x - 9)^2 + (y - 0)^2 = (\sqrt{65})^2$ $x^2 - 18x + 81 + y^2 = 65$ $x^2 + y^2 - 18x + 16 = 0$	B1 M1 A1	(12)												
9.	(a)	$\frac{\sin B}{3} = \frac{\sin 2.2}{7}$ $\sin B = \frac{3}{7} \sin 2.2$ $\angle ABC = 0.354$ (3sf)	M1 M1 A1													
	(b)	$\angle BAC = \pi - (2.2 + 0.3538) = 0.588$ (3sf)	M1 A1													
	(c)	$= \frac{1}{2} \times 3 \times 7 \times \sin 0.5878 = 5.82 \text{ m}^2$ (3sf)	M1 A1													
	(d)	$= 5.822 + [\frac{1}{2} \times 2^2 \times (2\pi - 0.5878)] + [\frac{1}{2} \times 1^2 \times (2\pi - 0.3538)]$ $= 20.2 \text{ m}^2$ (3sf)	M3 A1 A1	(12)												
Total				(75)												

Performance Record – C2 Paper G

[illegible]