

GCE Examinations
Advanced Subsidiary

Core Mathematics C1

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.

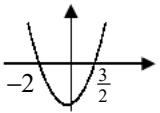
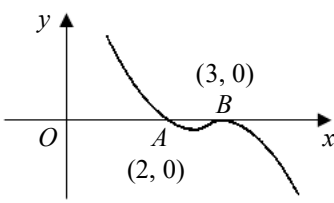
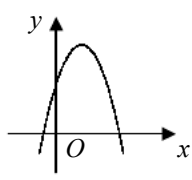


Written by Shaun Armstrong

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C1 Paper G – Marking Guide

1.	$(3^2)^x = 3^{x+2}$ $2x = x + 2, \quad x = 2$	M1 M1 A1	(3)
2.	$2x^2 + x - 6 \leq 0$ $(2x - 3)(x + 2) \leq 0$ critical values: $-2, \frac{3}{2}$ $-2 \leq x \leq \frac{3}{2}$	 M1 A1 M1 A1	(4)
3.	(a) $y = x^2 - 2ax + a^2$ $\frac{dy}{dx} = 2x - 2a = 2x - 6$ $\therefore a = 3$ (b) translation by 3 units in the negative x -direction	B1 M1 A1 A1 B2	(6)
4.	(a) $x^2 - 4x + 2 = 0$ $x = \frac{4 \pm \sqrt{16 - 8}}{2} = \frac{4 \pm 2\sqrt{2}}{2}$ $x = 2 \pm \sqrt{2}, \quad \therefore (2 - \sqrt{2}, 0), (2 + \sqrt{2}, 0)$ (b) $x^2 - 4x + 2 = 2x + k, \quad x^2 - 6x + 2 - k = 0$ tangent \therefore equal roots, $b^2 - 4ac = 0$ $(-6)^2 - [4 \times 1 \times (2 - k)] = 0$ $36 - 4(2 - k) = 0, \quad k = -7$	M2 A2 M1 A1 A1	(7)
5.	(a) 	B3	
	(b) $y = (2 - x)(9 - 6x + x^2)$ $y = 18 - 12x + 2x^2 - 9x + 6x^2 - x^3$ $y = 18 - 21x + 8x^2 - x^3$ $\frac{dy}{dx} = -21 + 16x - 3x^2$ grad $= -21 + 32 - 12 = -1$ $\therefore y - 0 = -(x - 2)$ $x + y = 2$	M1 M1 A1 M1 A1 M1 A1	(10)
6.	(a) $f(x) = 9 - [x^2 - 6x]$ $= 9 - [(x - 3)^2 - 9]$ $= 18 - (x - 3)^2, \quad A = 18, B = -3$ (b) 18 (c) $18 - (x - 3)^2 = 0, \quad x - 3 = \pm \sqrt{18}$ $x = 3 \pm 3\sqrt{2}$ (d) 	M1 M1 A2 B1 M1 M1 A1 B2	(10)

7.	(a)	(i)	$\frac{20}{2} [2a + (19 \times 7)] = 530$	M1	
			$2a + 133 = 53, a = -40$	M1 A1	
		(ii)	$= -40 + 7k = -40 + 42 = 2$	M1 A1	
	(b)	(i)	$u_1 = (1+k)^2, u_2 = (2+k)^2$	B1	
			$(2+k)^2 = 2(1+k)^2$	M1	
			$4 + 4k + k^2 = 2 + 4k + 2k^2$		
			$k^2 = 2$	M1	
			$k > 0 \therefore k = \sqrt{2}$	A1	
		(ii)	$u_3 = (3 + \sqrt{2})^2 = 9 + 6\sqrt{2} + 2 = 11 + 6\sqrt{2}$	M1 A1	(11)

8.	(a)		$\text{grad} = \frac{1-5}{4-(-2)} = -\frac{2}{3}$	M1 A1	
			$\therefore y - 5 = -\frac{2}{3}(x + 2)$	M1	
			$3y - 15 = -2x - 4$		
			$2x + 3y = 11$	A1	
	(b)		$\text{grad } l_2 = \frac{-1}{-\frac{2}{3}} = \frac{3}{2}$	M1 A1	
			$\therefore y - 1 = \frac{3}{2}(x - 4) \quad [3x - 2y = 10]$	A1	
	(c)		at C, $x = 0 \therefore y = -5 \Rightarrow C(0, -5)$	B1	
			$AB = \sqrt{(4+2)^2 + (1-5)^2} = \sqrt{36+16} = \sqrt{52}$	M1 A1	
			$BC = \sqrt{(0-4)^2 + (-5-1)^2} = \sqrt{16+36} = \sqrt{52}$		
			$AB = BC \therefore \text{triangle } ABC \text{ is isosceles}$	A1	(11)

9.	(a)		2	B1	
	(b)		$1 + \frac{2}{\sqrt{x}} = 2$	M1	
			$\sqrt{x} = 2$	M1	
			$x = 4$	A1	
	(c)		$x = 4 \therefore y = 2(4) - 1 = 7$	B1	
			$y = \int (1 + \frac{2}{\sqrt{x}}) dx$		
			$y = x + 4x^{\frac{1}{2}} + c$	M1 A2	
			$(4, 7) \therefore 7 = 4 + 8 + c$		
			$c = -5$	M1	
			$y = x + 4x^{\frac{1}{2}} - 5$	A1	
	(d)		$x + 4x^{\frac{1}{2}} - 5 = 0$		
			$(x^{\frac{1}{2}} + 5)(x^{\frac{1}{2}} - 1) = 0$	M1	
			$x^{\frac{1}{2}} = -5$ (no real solutions), 1	A1	
			$x = 1 \therefore (1, 0)$ and no other point	A1	(13)

Total (75)

Performance Record – C1 Paper G

Question no.	1	2	3	4	5	6	7	8	9	Total
Topic(s)	indices	inequal.	diff., transform.	quad. formula, rep. root	curve sketch, diff., tangent	compl. square	AP, sequence	straight lines	integr.	
Marks	3	4	6	7	10	10	11	11	13	75
Student										