

GCE Examinations
Advanced / Advanced Subsidiary

Core Mathematics C1

Sample Paper from Solomon Press

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.

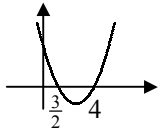
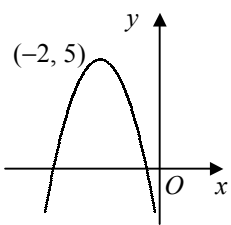
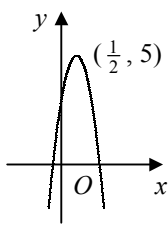
(B) marks are independent of method marks.

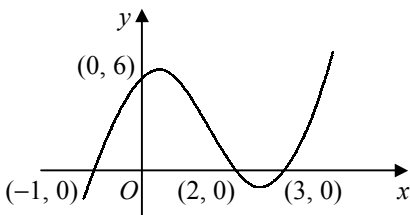


Written by Shaun Armstrong

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C1 Sample Paper – Marking Guide

1.	(i) $= 3^2 - [4 \times 2 \times (-1)] = 9 + 8 = 17$ (ii) discriminant $> 0 \therefore$ 2 real roots	M1 A1 B2	(4)
2.	$(2x - 3)(x - 4) < 0$ $\frac{3}{2} < x < 4$ 	M1 A1 M1 A1	(4)
3.	(i) $= (\frac{25}{4})^{-\frac{1}{2}} = \sqrt{\frac{4}{25}} = \frac{2}{5}$ (ii) $2^{x+1} = 2^2 \times 2^{\frac{1}{2}} = 2^{\frac{5}{2}}$ $x + 1 = \frac{5}{2}$ $x = \frac{3}{2}$	M1 A1 B1 M1 A1	(5)
4.	$2x - y + 9 = 0 \Rightarrow y = 2x + 9$ sub. into $x^2 + 2xy + y^2 = 9$ $x^2 + 2x(2x + 9) + (2x + 9)^2 = 9$ $x^2 + 6x + 8 = 0$ $(x + 2)(x + 4) = 0$ $x = -2, -4$ $\therefore x = -2, y = 5$ or $x = -4, y = 1$	M1 M1 A1 M1 A1 M1 A1	(7)
5.	(a) (i)  (ii)  (b) quadratic, turning point (1, 5) $\therefore f(x) = k(x - 1)^2 + 5 = kx^2 - 2kx + k + 5$ $\therefore k + 5 = 3, k = -2$ $\therefore a = -2, b = 4$	B2 B2 M1 A1 M1 A1	(8)
6.	(i) $\frac{dy}{dx} = 1 - 8x^{-2}$ at A, $1 - 8x^{-2} = 0$ $x^2 = 8$ $x > 0 \therefore x = \sqrt{8} = \sqrt{4 \times 2} = 2\sqrt{2}$ (ii) $y = 2\sqrt{2} + \frac{8}{2\sqrt{2}} + 3$ $= 2\sqrt{2} + 2\sqrt{2} + 3 = 4\sqrt{2} + 3$ (iii) $\frac{d^2y}{dx^2} = 16x^{-3}$ at A, $\frac{d^2y}{dx^2} = \frac{16}{(2\sqrt{2})^3}$ $\frac{d^2y}{dx^2} > 0 \therefore$ minimum point	M1 A1 M1 A1 A1 M1 A1 M1 A1	(10)

7.	(i)	$\text{grad} = \frac{3-2}{1-(-2)} = \frac{1}{3}$	M1 A1	
		$\therefore y - 2 = \frac{1}{3}(x + 2)$	M1	
		$3y - 6 = x + 2$		
		$x - 3y + 8 = 0$	A1	
	(ii)	$\text{grad } l_2 = \frac{-1}{\frac{1}{3}} = -3$	M1	
		$\therefore y + 1 = -3(x - 9) \quad [y = 26 - 3x]$	A1	
	(iii)	at D, $x - 3(26 - 3x) + 8 = 0$	M1	
		$x = 7 \therefore D(7, 5)$	A1	
		$AB = \sqrt{(1+2)^2 + (3-2)^2} = \sqrt{9+1} = \sqrt{10}$	M1	
		$AD = \sqrt{(7+2)^2 + (5-2)^2} = \sqrt{81+9} = \sqrt{90} = 3\sqrt{10}$	A1	
		$\therefore AB : AD = \sqrt{10} : 3\sqrt{10} = 1 : 3$	A1	(11)
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8.	(i)	$\text{LHS} = (x + 1)(x^2 - 5x + 6) = x(x^2 - 5x + 6) + (x^2 - 5x + 6)$	M1	
		$= x^3 - 5x^2 + 6x + x^2 - 5x + 6 = x^3 - 4x^2 + x + 6 = \text{RHS}$	A1	
	(ii)		B3	
	(iii)	when $x = 1$, $y = 1 - 4 + 1 + 6 = 4$	B1	
		$\frac{dy}{dx} = 3x^2 - 8x + 1$	M1 A1	
		when $x = 1$, $\text{grad} = 3 - 8 + 1 = -4$	A1	
		$\therefore y - 4 = -4(x - 1) \quad [y = 8 - 4x]$	M1 A1	(11)
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9.	(i)	$\text{grad } PQ = \frac{7-3}{4-(-8)} = \frac{1}{3}$, $\text{grad } QR = \frac{1-7}{6-4} = -3$	M1	
		$\text{grad } PQ \times \text{grad } QR = \frac{1}{3} \times (-3) = -1$	M1	
		$\therefore PQ \text{ perp. to } QR, \therefore \angle PQR = 90^\circ$	A1	
	(ii)	$\angle PQR = 90^\circ \therefore PR \text{ is a diameter}$		
		$\therefore \text{centre} = \text{mid-point of } PR = \left(\frac{-8+6}{2}, \frac{3+1}{2}\right) = (-1, 2)$	M1 A1	
	(iii)	radius = dist. $(-8, 3)$ to $(-1, 2) = \sqrt{49+1} = \sqrt{50}$	B1	
		$(x + 1)^2 + (y - 2)^2 = (\sqrt{50})^2$	M1	
		$x^2 + 2x + 1 + y^2 - 4y + 4 = 50$		
		$x^2 + y^2 + 2x - 4y - 45 = 0$	A1	
	(iv)	$\text{grad of radius} = \frac{7-2}{4-(-1)} = 1$	M1	
		$\therefore \text{grad of tangent} = \frac{-1}{1} = -1$	A1	
		$\therefore y - 7 = -1(x - 4)$	M1	
		$y = 11 - x$	A1	(12)
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Total				(72)

Performance Record – C1 Sample Paper

[illegible]