FOR OCR

GCE Examinations

Advanced / Advanced Subsidiary

Core Mathematics C1

Paper B

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

C1 Paper B – Marking Guide

1. real and distinct roots $\therefore\ b^2 - 4ac > 0$

$(-6)^2 - (4 \times 1 \times k) > 0$ M1

$36 - 4k > 0$

$k < 9$ M1 A1 **(3)**

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2. grad $AB = \frac{-2-0}{5-(-3)} = -\frac{1}{4}$ M1 A1

$\therefore\ y - 1 = -\frac{1}{4}(x - 4)$ M1

$4y - 4 = -x + 4$

$x + 4y = 8$ A1 **(4)**

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3. *(i)* $= \frac{18}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 6\sqrt{3}$ M1 A1

(ii) $= 4 - 2\sqrt{3} - 4\sqrt{3} + 6 = 10 - 6\sqrt{3}$ M1 A1 **(4)**

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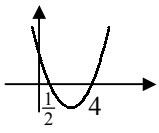
4. $(2x - 1)(x - 4) < 0$ M1

critical values: $\frac{1}{2}$, 4 A1



M1

$\frac{1}{2} < x < 4$ A1 **(4)**

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5. LHS $= 2x^4 + kx^3 + 7x^2 + 4x^3 + 2kx^2 + 14x - 6x^2 - 3kx - 21$ M1

$\therefore\ k + 4 = A$ M1

$7 + 2k - 6 = A$ A1

$\therefore\ k + 4 = 1 + 2k$ M1

$k = 3$ A1

$A = 7$ A1

$B = 14 - 3k = 5$ A1 **(7)**

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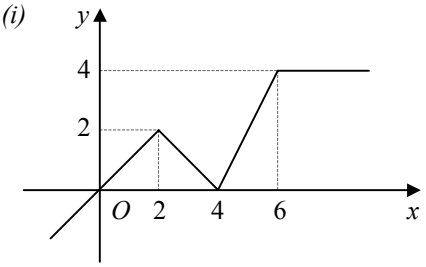
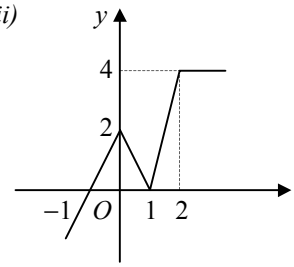
6. *(a)* *(i)* 3 B1

(ii) 1 B1

(b) *(i)*



(ii)



B3 B3 **(8)**

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7. *(i)* $= 3x^2 - 18x$ M1 A1

(ii) $= 6x - 18$ B1

(iii) for SP, $3x^2 - 18x = 0$ M1

$3x(x - 6) = 0$ M1

$x = 0, 6$

$\therefore\ (0, 0), (6, -108)$ A2

(iv) $f''(0) = -18,\ f''(x) < 0\ \therefore$ (0, 0) maximum M1

$f''(6) = 18,\ f''(x) > 0\ \therefore$ (6, −108) minimum A1 **(9)**

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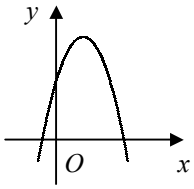
8. *(i)* $f(x) = 9 - [x^2 - 6x]$ M1
$= 9 - [(x-3)^2 - 9]$ M1
$= 18 - (x-3)^2, \quad A = 18, B = -3$ A2

(ii) 18 B1

(iii) $18 - (x-3)^2 = 0$
$x - 3 = \pm\sqrt{18}$ M1
$x = 3 \pm 3\sqrt{2}$ M1 A1

(iv)



B2

(10)

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9. *(i)* radius $= \sqrt{25+1} = \sqrt{26}$ M1 A1
$\therefore\ (x+3)^2 + (y-2)^2 = (\sqrt{26})^2$ M1
$(x+3)^2 + (y-2)^2 = 26$ A1

(ii) $(-4, 7)$, LHS $= (-4+3)^2 + (7-2)^2 = 1 + 25 = 26$ $\therefore$ lies on circle B1

(iii) grad of radius $= \frac{7-2}{-4-(-3)} = -5$ M1

$\therefore$ grad of tangent $= \frac{-1}{-5} = \frac{1}{5}$ M1 A1

$\therefore\ y - 7 = \frac{1}{5}(x+4)$ M1

$5y - 35 = x + 4$
$x - 5y + 39 = 0$ A1 **(10)**

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10. *(i)* $y = x - 6\sqrt{x} + 9$ M1 A1

$\frac{dy}{dx} = 1 - 3x^{-\frac{1}{2}} = 1 - \frac{3}{\sqrt{x}}$ M1 A1

(ii) $x = 4 \ \therefore y = 1$ B1

grad of tangent $= 1 - \frac{3}{2} = -\frac{1}{2}$ M1

grad of normal $= \frac{-1}{-\frac{1}{2}} = 2$ A1

$\therefore\ y - 1 = 2(x-4)$ M1
$y = 2x - 7$ A1

(iii) at intersect: $x - 6\sqrt{x} + 9 = 2x - 7$
$x + 6\sqrt{x} - 16 = 0$ M1
$(\sqrt{x} + 8)(\sqrt{x} - 2) = 0$ M1
$\sqrt{x} = -8, 2$ A1

$\sqrt{x} = 2 \Rightarrow x = 4$ (at P)
$\sqrt{x} = -8 \Rightarrow$ no real solutions $\therefore$ normal does not intersect again A1 **(13)**

Total **(72)**

Performance Record – C1 Paper B

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	Total
Topic(s)	roots of quad.	straight line	surds	inequal.	polynom.	transform.	SP	compl. square	circle	diff., normal	
Marks	3	4	4	4	7	8	9	10	10	13	72
Student											