FOR EDEXCEL

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

C1 Paper G – Marking Guide

1. $(3^2)^x = 3^{x+2}$ M1
$2x = x + 2, \quad x = 2$ M1 A1 **(3)**

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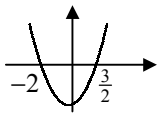
2. $2x^2 + x - 6 \leq 0$
$(2x - 3)(x + 2) \leq 0$ M1
critical values: $-2, \frac{3}{2}$ A1



M1
$-2 \leq x \leq \frac{3}{2}$ A1 **(4)**

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3. *(a)* $y = x^2 - 2ax + a^2$ B1
$\frac{dy}{dx} = 2x - 2a = 2x - 6$ M1 A1
$\therefore \ a = 3$ A1
(b) translation by 3 units in the negative x-direction B2 **(6)**

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4. *(a)* $x^2 - 4x + 2 = 0$
$x = \frac{4 \pm \sqrt{16-8}}{2} = \frac{4 \pm 2\sqrt{2}}{2}$ M2
$x = 2 \pm \sqrt{2}, \quad \therefore \ (2 - \sqrt{2}, 0), (2 + \sqrt{2}, 0)$ A2
(b) $x^2 - 4x + 2 = 2x + k, \quad x^2 - 6x + 2 - k = 0$
tangent $\therefore$ equal roots, $b^2 - 4ac = 0$
$(-6)^2 - [4 \times 1 \times (2 - k)] = 0$ M1 A1
$36 - 4(2 - k) = 0, \quad k = -7$ A1 **(7)**

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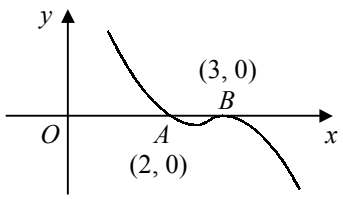
5. *(a)*



B3
(b) $y = (2 - x)(9 - 6x + x^2)$ M1
$y = 18 - 12x + 2x^2 - 9x + 6x^2 - x^3$ M1
$y = 18 - 21x + 8x^2 - x^3$ A1
$\frac{dy}{dx} = -21 + 16x - 3x^2$ M1 A1
grad $= -21 + 32 - 12 = -1$
$\therefore \ y - 0 = -(x - 2)$ M1
$x + y = 2$ A1 **(10)**

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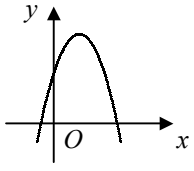
6. *(a)* $f(x) = 9 - [x^2 - 6x]$ M1
$= 9 - [(x - 3)^2 - 9]$ M1
$= 18 - (x - 3)^2, \quad A = 18, B = -3$ A2
(b) 18 B1
(c) $18 - (x - 3)^2 = 0, \quad x - 3 = \pm\sqrt{18}$ M1
$x = 3 \pm 3\sqrt{2}$ M1 A1
(d)



B2 **(10)**

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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)**

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8. *(a)* 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) grad $l_2 = \frac{-1}{-\frac{2}{3}} = \frac{3}{2}$ M1 A1

$\therefore\ y - 1 = \frac{3}{2}(x - 4)$ $[\ 3x - 2y = 10\ ]$ 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

$BC = \sqrt{(0-4)^2 + (-5-1)^2} = \sqrt{16+36} = \sqrt{52}$

$AB = BC\ \therefore$ triangle ABC is isosceles A1 **(11)**

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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

$y = \int (1 + \frac{2}{\sqrt{x}})\ \mathrm{d}x$

$y = x + 4x^{\frac{1}{2}} + c$ 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										