FOR EDEXCEL

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.

Written by Shaun Armstrong

C2 Paper G – Marking Guide

1. $= \int_{-2}^{0} (9x^2 - 6x + 1)\ dx$ M1

$= [3x^3 - 3x^2 + x]_{-2}^{0}$ M1 A1

$= (0) - (-24 - 12 - 2) = 38$ M1 A1 **(5)**

---

2. *(a)* $f(-1) = 0 \quad \therefore\ -1 - k - 20 = 0$ M1

$k = -21$ A1

(b)

$$x + 1 \overline{)\ x^3 + 0x^2 - 21x - 20}$$

$$x^3 + x^2$$

$$-x^2 - 21x$$

$$-x^2 - x$$

$$-20x - 20$$

$$-20x - 20$$

M1 A1

$(x + 1)(x^2 - x - 20) = 0$

$(x + 1)(x + 4)(x - 5) = 0$ M1

$x = -4, -1, 5$ A1 **(6)**

---

3. *(a)* $5 \cos \theta = 2 \sin \theta$

$\frac{5}{2} = \frac{\sin\theta}{\cos\theta}$ M1

$\tan \theta = 2.5$ A1

(b) $\tan 2x = 2.5$

$2x = 68.199, 180 + 68.199$ B1 M1

$2x = 68.199, 248.199$

$x = 34.1, 124.1$ (1dp) M1 A1 **(6)**

---

4. *(a)* $(x - 2) \lg 3 = \lg 5$ M1

$x = \frac{\lg 5}{\lg 3} + 2 = 3.46$ (3sf) M1 A1

(b) $\log_2 (6 - y) + \log_2 y = 3$

$\log_2 [y(6 - y)] = 3$ M1

$y(6 - y) = 2^3 = 8$ M1

$y^2 - 6y + 8 = 0$

$(y - 2)(y - 4) = 0$ M1

$y = 2, 4$ A1 **(7)**

---

5. *(a)* $r = \frac{27}{36} = \frac{3}{4}$ M1 A1

(b) $= 27 \times \frac{3}{4} = 20\frac{1}{4}$ M1 A1

(c) $a \times (\frac{3}{4})^2 = 36$ M1

$a = 36 \times \frac{16}{9} = 64$ A1

$S_\infty = \frac{64}{1 - \frac{3}{4}} = 256$ M1 A1 **(8)**

---

6. *(a)*

x	2	3	4	5	6
y	2.89	6.36	11.55	18.50	27.27

B2

(b) area $\approx \frac{1}{2} \times 1 \times [2.89 + 27.27 + 2(6.36 + 11.55 + 18.50)]$ B1 M1 A1

$= 51.5$ (3sf) A1

(c) over-estimate B1

the curve passes below the top edge of each trapezium B1 **(8)**

---

7. *(a)* $f'(x) = 12x - 3x^2$ M1 A1

for SP, $12x - 3x^2 = 0$

$3x(4 - x) = 0$ M1

$x = 0, 4$

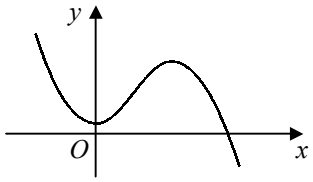
$\therefore$ (0, 2), (4, 34) A2

(b) $f''(x) = 12 - 6x$ M1

$f''(0) = 12$, $f''(x) > 0$ $\therefore$ (0, 2) minimum A1

$f''(4) = -12$, $f''(x) < 0$ $\therefore$ (4, 34) maximum 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 $= \frac{-1}{-2} = \frac{1}{2}$ M1

perp. bisector: $y + 2 = \frac{1}{2}(x - 5)$ M1 A1

centre where $y = 0$ $\therefore x = 9$ $\Rightarrow$ (9, 0) M1 A1

(d) radius = dist. (2, 4) to (9, 0) $= \sqrt{49+16} = \sqrt{65}$ B1

$\therefore (x - 9)^2 + (y - 0)^2 = (\sqrt{65})^2$ M1

$x^2 - 18x + 81 + y^2 = 65$

$x^2 + y^2 - 18x + 16 = 0$ A1 **(12)**

---

9. *(a)* $\frac{\sin B}{3} = \frac{\sin 2.2}{7}$ M1

$\sin B = \frac{3}{7} \sin 2.2$

$\angle ABC = 0.354$ (3sf) M1 A1

(b) $\angle BAC = \pi - (2.2 + 0.3538) = 0.588$ (3sf) M1 A1

(c) $= \frac{1}{2} \times 3 \times 7 \times \sin 0.5878 = 5.82$ m^2 (3sf) M1 A1

(d) $= 5.822 + [\frac{1}{2} \times 2^2 \times (2\pi - 0.5878)] + [\frac{1}{2} \times 1^2 \times (2\pi - 0.3538)]$ M3 A1

$= 20.2$ m^2 (3sf) A1 **(12)**

Total **(75)**

Performance Record – C2 Paper G

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Total
Topic(s)	integr.	factor theorem, alg. div.	trig. eqn	logs	GP	trapezium rule	SP	circle	sine rule, sector of a circle	
Marks	5	6	6	7	8	8	11	12	12	75
Student										