FOR EDEXCEL

GCE Examinations

Advanced Subsidiary

Core Mathematics C2

Paper L

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

© Solomon Press

These sheets may be copied for use solely by the purchaser's institute.

C2 Paper L – Marking Guide

1. *(a)* $r = \frac{-15}{75} = -\frac{1}{5}$ — M1 A1

(b) $= \frac{75}{1-(-\frac{1}{5})} = 62\frac{1}{2}$ — M1 A1 **(4)**

---

2. *(a)* $(x+4)^2 - 16 + (y-2)^2 - 4 + k = 0$ — M1
$\therefore$ centre $(-4, 2)$ — A1

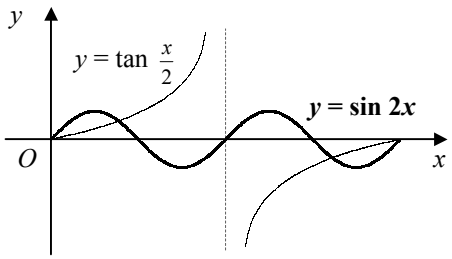
(b) for x-axis to be tangent, radius must be 2 — B1
$(x+4)^2 + (y-2)^2 = 20 - k$
$\therefore$ $20 - k = 2^2$ — M1
$k = 16$ — A1 **(5)**

---

3. area of segment $= (\frac{1}{2} \times r^2 \times \frac{\pi}{3}) - (\frac{1}{2} \times r^2 \times \sin\frac{\pi}{3})$ — B1 M2
$= \frac{1}{6}r^2\pi - \frac{1}{4}r^2\sqrt{3}$ — A1
shaded area $= \frac{1}{6}r^2\pi - 2(\frac{1}{6}r^2\pi - \frac{1}{4}r^2\sqrt{3})$ — M1
$= \frac{1}{6}r^2\pi - \frac{1}{3}r^2\pi + \frac{1}{2}r^2\sqrt{3}$
$= \frac{1}{2}r^2\sqrt{3} - \frac{1}{6}r^2\pi = \frac{1}{6}r^2(3\sqrt{3} - \pi)$ — A1 **(6)**

---

4. *(a)*



B2
B2

(b) 4 solutions — B1
the graphs intersect at 4 points — B1 **(6)**

---

5. *(a)* $\log_a 27 - \log_a 8 = 3$
$\log_a \frac{27}{8} = 3$ — M1
$a^3 = \frac{27}{8}$, $a = \sqrt[3]{\frac{27}{8}} = \frac{3}{2}$ — M1 A1

(b) $(x+3)\lg 2 = (x-1)\lg 6$ — M1
$x(\lg 6 - \lg 2) = 3\lg 2 + \lg 6$ — M1
$x = \frac{3\lg 2 + \lg 6}{\lg 6 - \lg 2} = 3.52$ — M1 A1 **(7)**

---

6. *(a)* $= 2^4 + 4(2^3)(x) + 6(2^2)(x^2) + 4(2)(x^3) + x^4$ — M1 A1
$= 16 + 32x + 24x^2 + 8x^3 + x^4$ — B1 A1

(b) $(2-x)^4 = 16 - 32x + 24x^2 - 8x^3 + x^4$ — M1
$(2+x)^4 + (2-x)^4 = 32 + 48x^2 + 2x^4$, $A = 32$, $B = 48$, $C = 2$ — A1

(c) $32 + 48x^2 + 2x^4 = 136$
$x^4 + 24x^2 - 52 = 0$
$(x^2 + 26)(x^2 - 2) = 0$ — M1
$x^2 = -26$ (no real solutions) or 2 — A1
$x = \pm\sqrt{2}$ — A1 **(9)**

© Solomon Press

7. *(a)* $f(2) = 16 - 20 + 2 + 2 = 0 \ \therefore (x-2)$ is a factor — M1 A1

(b)

$$x-2 \overline{)\ 2x^3 - 5x^2 + x + 2}$$

$2x^3 - 4x^2$

$-x^2 + x$

$-x^2 + 2x$

$-x + 2$

$-x + 2$

M1 A1

$f(x) = (x-2)(2x^2 - x - 1) = (x-2)(2x+1)(x-1)$ — M1 A1

(c) $x = -\frac{1}{2}, 1, 2$ — B1

(d) $\sin\theta = 2$ (no solutions), $-\frac{1}{2}$ or 1

$\theta = \pi + \frac{\pi}{6}, 2\pi - \frac{\pi}{6}$ or $\frac{\pi}{2}$ — M1 B1

$\theta = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$ — A2 **(11)**

---

8. *(a)* $3 - x^{\frac{1}{2}} - 2x^{-\frac{1}{2}} = 0, \quad 3x^{\frac{1}{2}} - x - 2 = 0$ — M1

$x - 3x^{\frac{1}{2}} + 2 = 0, \quad (x^{\frac{1}{2}} - 1)(x^{\frac{1}{2}} - 2) = 0$ — M1

$x^{\frac{1}{2}} = 1, 2$ — A1

$x = 1, 4 \ \therefore (1, 0), (4, 0)$ — A1

(b) $\frac{dy}{dx} = -\frac{1}{2}x^{-\frac{1}{2}} + x^{-\frac{3}{2}}$ — M1 A1

for minimum, $-\frac{1}{2}x^{-\frac{1}{2}} + x^{-\frac{3}{2}} = 0$ — M1

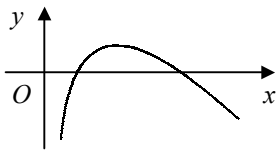
$-\frac{1}{2}x^{-\frac{3}{2}}(x-2) = 0$

$x = 2, \ y = 3 - \sqrt{2} - \frac{2}{\sqrt{2}} \ \therefore (2, 3 - 2\sqrt{2})$ — A2

(c) $\frac{d^2y}{dx^2} = \frac{1}{4}x^{-\frac{3}{2}} - \frac{3}{2}x^{-\frac{5}{2}}$ — M1

when $x = 2, \ \frac{d^2y}{dx^2} = \frac{1}{8\sqrt{2}} - \frac{3}{8\sqrt{2}} = -\frac{1}{4\sqrt{2}}, \ \frac{d^2y}{dx^2} < 0 \ \therefore$ maximum — A1

(d)



B2 **(13)**

---

9. *(a)* $x = 4 \ \therefore y = 12 - 8 + 2 = 6$ — B1

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

grad $= 3 - 1 = 2$ — M1

$\therefore \ y - 6 = 2(x-4)$ — M1

$y = 2x - 2$ — A1

(b) area under curve $= \int_0^4 (3x - 4\sqrt{x} + 2)\,dx$

$= [\frac{3}{2}x^2 - \frac{8}{3}x^{\frac{3}{2}} + 2x]_0^4$ — M1 A2

$= (24 - \frac{64}{3} + 8) - (0) = 10\frac{2}{3}$ — M1

tangent meets x-axis when $y = 0 \Rightarrow x = 1$ — M1

area of triangle $= \frac{1}{2} \times 3 \times 6 = 9$ — A1

shaded area $= 10\frac{2}{3} - 9 = \frac{5}{3}$ — M1 A1 **(14)**

Total **(75)**

© *Solomon Press*

Performance Record – C2 Paper L

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Total
Topic(s)	GP	circle	sector of a circle	trig. graph	logs	binomial	factor theorem, trig. eqn	SP	area by integr.	
Marks	4	5	6	6	7	9	11	13	14	75
Student										

© *Solomon Press*