

C2 Paper A – Marking Guide

1. (i) $\frac{1}{2} \times 9.2^2 \times \angle AOB = 37.4$ M1
 $\angle AOB = 0.884$ radians (3sf) A1
(ii) $= (2 \times 9.2) + (9.2 \times 0.8837)$ M1
 $= 26.5$ cm (3sf) A1 **(4)**

2. (i) $f(-1) = 0 \quad \therefore -1 - k - 20 = 0$ M1
 $k = -21$ A1

(ii)

$$\begin{array}{r} x^2 - x - 20 \\ x+1 \overline{)x^3 + 0x^2 - 21x - 20} \\ x^3 + x^2 \\ \hline -x^2 - 21x \\ -x^2 - x \\ \hline -20x - 20 \\ -20x - 20 \\ \hline \end{array}$$

M1 A1

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

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

$$x = -4, -1, 5$$
 M1
A1 **(6)**

3. $y = \int (3\sqrt{x} - x^2) \, dx$

$$y = 2x^{\frac{3}{2}} - \frac{1}{3}x^3 + c$$
 M1 A2

$$x = 1, y = \frac{2}{3} \quad \therefore \frac{2}{3} = 2 - \frac{1}{3} + c$$
 M1

$$c = -1$$
 A1

$$y = 2x^{\frac{3}{2}} - \frac{1}{3}x^3 - 1$$

$$\text{when } x = 4, \quad y = 2(\sqrt{4})^3 - \frac{1}{3}(4^3) - 1$$
 M1

$$y = 16 - 21\frac{1}{3} - 1 = -6\frac{1}{3}$$
 A1 **(7)**

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

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

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

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

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

5. (i) $\log_2(6-x) + \log_2 x = 3$ M1

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

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

$$x^2 - 6x + 8 = 0$$
 M1

$$(x-2)(x-4) = 0$$
 A1

$$x = 2, 4$$
 A1

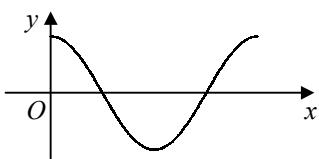
(ii) $(n-2)\lg 3 > 250 \lg 8$ M1

$$n > \frac{250 \lg 8}{\lg 3} + 2$$
 A1

$$n > 475.2$$
 M1

$$\text{smallest } n = 476$$
 A1 **(8)**

6. (i)



B2

(ii) $(0, 1), (\frac{\pi}{4}, 0), (\frac{3\pi}{4}, 0)$

B3

(iii) $\cos 2x = 0.5$

$$2x = \frac{\pi}{3}, 2\pi - \frac{\pi}{3}$$

B1 M1

$$2x = \frac{\pi}{3}, \frac{5\pi}{3}$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6}$$

A1

(8)

7.

(i) $= \frac{1}{2}x^2 + 5x + 6x^{\frac{1}{2}} + c$

M1 A3

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

M1

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

M1 A1

$$= (0) - (-24 - 12 - 2) = 38$$

M1 A1

(9)

8.

(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

$$4 + 4k + k^2 = 2 + 4k + 2k^2$$

M1

$$k^2 = 2$$

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)

9.

(i) $2x^2 + 6x + 7 = 2x + 13$

M1

$$x^2 + 2x - 3 = 0$$

M1

$$(x+3)(x-1) = 0$$

A1

$$x = -3, 1$$

A1

$$\therefore (-3, 7), (1, 15)$$

(ii) area = $\int_{-3}^1 [(2x+13) - (2x^2 + 6x + 7)] dx$

M1

$$= \int_{-3}^1 (6 - 4x - 2x^2) dx$$

A1

(iii) $= [6x - 2x^2 - \frac{2}{3}x^3]_{-3}^1$

M1 A2

$$= (6 - 2 - \frac{2}{3}) - (-18 - 18 + 18) = 21\frac{1}{3}$$

M1 A1

(11)

Total

(72)