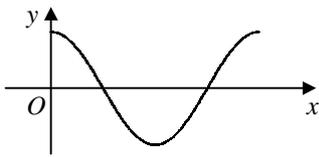# C2 Paper A – Marking Guide

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)**

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

           $k = -21$ A1

     (ii)

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

     M1 A1

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

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

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

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

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

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

               $c = -1$ A1

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

       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)**

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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)**

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

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

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

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

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

           $x = 2, 4$ A1

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

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

           $n > 475.2$ M1

           smallest $n = 476$ A1   **(8)**

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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)**

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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)**

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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

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

              $k^2 = 2$ 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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9. (i) $2x^2 + 6x + 7 = 2x + 13$

        $x^2 + 2x - 3 = 0$ M1

        $(x + 3)(x - 1) = 0$ M1

        $x = -3, 1$ A1

        $\therefore\ (-3, 7), (1, 15)$ A1

    (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)**