

## Worked Solutions

### OCR C2 Paper A

1.  $1 + 7 \times (2x) + \frac{7 \times 6}{2} \times (2x)^2 = 1 + 14x + 84x^2$

(4)

2.  $\left[2x^3 + c \frac{x^2}{2}\right]_1^4 = 96$

$$128 + 8c - \left(2 + \frac{1}{2}c\right) = 96$$
$$c = -4$$

3. first term =  $a$ , common ratio =  $2a$

$$\frac{a}{1 - 2a} = 8, \quad a = \frac{8}{17}$$

(4)

4. (i)  $\log_{10} 2^x = \log_{10} 7$

$$x \log_{10} 2 = \log_{10} 7$$

$$x = \frac{\log_{10} 7}{\log_{10} 2} = 2.81$$

(3)

(ii)  $\log_3 \left(\frac{3x+1}{x}\right) = 2$

$$\frac{3x+1}{x} = 3^2 = 9$$

$$3x+1 = 9x$$

$$x = \frac{1}{6}$$

(4)

5. (i)  $(\div \cos x) \frac{5 \sin x}{\cos x} = 7 \quad (\cos x \neq 0)$

$$\tan x = \frac{7}{5}$$

(1)

(ii)  $\tan x = \frac{7}{5}, \quad x = 54.5^\circ, 234.5^\circ$

(3)

(iii)  $2(1 - \cos^2 y) = 2 - \cos y$

(5)

$$2 \cos^2 y - \cos y = 0$$

$$\cos y(2 \cos y - 1) = 0$$

$$\text{either } \cos y = 0 \Rightarrow y = 90^\circ, 270^\circ$$

$$\text{or } \cos y = \frac{1}{2} \Rightarrow y = 60^\circ, 300^\circ$$

(6)

6. (i)  $f(2) = 0,$

$$8 + 12 - 8 + k = 0$$

$$k = -12$$

(2)

(ii)  $(x-2)(x^2+5x+6) = x^3+3x^2-4x-12$

(2)

(iii)  $f(x) = (x-2)(x+3)(x+2)$

(2)

(iv) remainder =  $f(3) = 30$

(2)

7. (i)  $a = -7, a + 7d = 14$

$\therefore d = 3$

$S_{30} = \frac{30}{2} [-14 + (29 \times 3)] = 1095$

(ii)  $-7 + (n - 1) \times 3 = 212$

$(n - 1) = \frac{219}{3}$

$n = 74$

(iii)  $S_n = 114$

$114 = \frac{n}{2} [-14 + (n - 1) \times 3]$

$228 = -14n + 3n^2 - 3n \quad 3n^2 - 17n - 228 = 0$

$(n - 12)(3n + 19) = 0 \quad n = 12$

8. (i)  $x^2 + 2x + 5 = 9 - x$

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

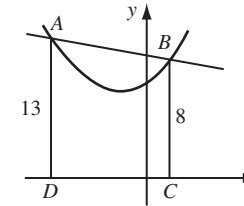
$x = -4, y = 13 \quad A \text{ is } (-4, 13)$

or  $x = 1, y = 8 \quad B \text{ is } (1, 8)$

(ii) area of trapezium  $ABCD$

$= \frac{1}{2}(13 + 8) \times 5$

$= 52\frac{1}{2}$



(4)

area under curve  $= \int_{-4}^1 (x^2 + 2x + 5) dx = \left[ \frac{1}{3}x^3 + x^2 + 5x \right]_{-4}^1$

$= \left( \frac{1}{3} + 1 + 5 \right) - \left( \frac{-64}{3} + 16 - 20 \right) = 31\frac{2}{3}$

(2)

$\therefore \text{area of } R = 52\frac{1}{2} - 31\frac{2}{3} = 20\frac{5}{6} \text{ units}^2$

(7)

(4)

9. (i) by cosine rule,  $AC^2 = 5^2 + 8^2 - (2 \times 5 \times 8 \times \cos 1.3^c)$

$AC = 8.222 \text{ cm}$

(3)

(ii)  $\frac{1}{2} \times 3^2 \times 1.3 = 5.85 \text{ cm}^2$

(2)

(iii) area of  $\triangle ABC = \frac{1}{2} \times 8 \times 5 \times \sin 1.3 = 19.271 \text{ cm}^2$

(5)

area of  $R = 19.271 - 5.85$

$= 13.4 \text{ cm}^2$

(3)

(iv) arc  $LM = 3 \times 1.3 = 3.9 \text{ cm}$

perimeter of  $R = 3.9 + 2 + 8.222 + 5$

$= 19.1 \text{ cm}$

(4)