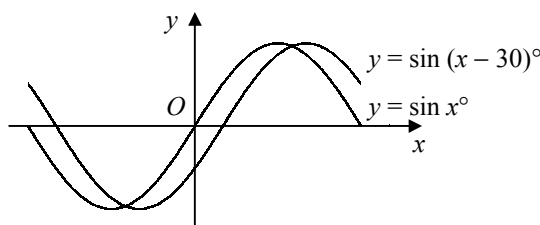
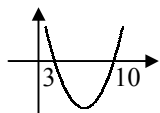


## C2 Paper I – Marking Guide

1. (i)  $u_1 = 2 + k$   
 $u_3 = 8 + 3k$   
 $u_1 = u_3 \therefore 2 + k = 8 + 3k$   
 $k = -3$  B1  
M1  
A1
- (ii)  $u_5 = 2^5 - 3(5) = 32 - 15 = 17$  M1 A1 (5)
- 

2.  $= \int (2x^{\frac{3}{2}} - 1)^2 dx$   
 $= \int (4x^3 - 4x^{\frac{3}{2}} + 1) dx$  M1 A1  
 $= x^4 - \frac{8}{5}x^{\frac{5}{2}} + x + c$  M1 A3 (6)
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3. (i), (ii)  B2  
B2
- (iii)  $x = -75, 105$  B2 (6)
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4. (i)  $(x - 3)(x - 10) < 0$   M1  
M1  
A1
- $3 < x < 10$
- (ii) let  $x = 2^y$   
 $\Rightarrow 3 < 2^y < 10$   
 $\lg 3 < y \lg 2 < \lg 10$  M1  
 $\frac{\lg 3}{\lg 2} < y < \frac{\lg 10}{\lg 2}$  M1  
 $1.58 < y < 3.32$  (3sf) A1 (6)
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5. (i)  $(-4, 0) \therefore 0 = 4 - 20 + 16k + 128$  M1  
 $16k = -112, k = -7$  A1
- (ii)  $4 + 5x - 7x^2 - 2x^3 = 0$   
 $x = -4$  is a solution  $\therefore (x + 4)$  is a factor B1
- $$\begin{array}{r} -2x^2 + x + 1 \\ x+4 \overline{) -2x^3 - 7x^2 + 5x + 4} \\ \underline{-2x^3 - 8x^2} \phantom{+ 4} \\ x^2 + 5x \phantom{+ 4} \\ \underline{x^2 + 4x} \phantom{+ 4} \\ x + 4 \\ \underline{x + 4} \\ 0 \end{array}$$
- M1 A1
- $\therefore (x + 4)(1 + x - 2x^2) = 0$   
 $(x + 4)(1 + 2x)(1 - x) = 0$  M1  
 $x = -4$  (at A),  $-\frac{1}{2}, 1$
- $\therefore (-\frac{1}{2}, 0), (1, 0)$  A1 (7)
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6.	(i)	$f(x) = \int (5 + \frac{4}{x^2}) dx$ $f(x) = 5x - 4x^{-1} + c$	M1 A2
	(ii)	$f(1) = 5 - 4 + c = 1 + c$ $f(2) = 10 - 2 + c = 8 + c$ $f(2) = 2f(1) \therefore 8 + c = 2(1 + c)$ $c = 6$ $f(x) = 5x - 4x^{-1} + 6$ $f(4) = 20 - 1 + 6 = 25$	M1 M1 A1 M1 A1 (8)

7.	(i)	$\frac{\sin B}{3} = \frac{\sin 2.2}{7}$ $\sin B = \frac{3}{7} \sin 2.2$ $\angle ABC = 0.354$ (3sf)	M1 A1
	(ii)	$\angle BAC = \pi - (2.2 + 0.3538) = 0.588$ (3sf)	M1 A1
	(iii)	$= \frac{1}{2} \times 3 \times 7 \times \sin 0.5878 = 5.82 \text{ m}^2$ (3sf)	M1 A1
	(iv)	$= 5.822 + [\frac{1}{2} \times 2^2 \times (2\pi - 0.5878)] + [\frac{1}{2} \times 1^2 \times (2\pi - 0.3538)]$ $= 20.2 \text{ m}^2$ (3sf)	M3 A1 (10)

8.	(i)	$x$ 2                      4                      6                      8 $1 + 3\sqrt{x}$ 5.243            7            8.348            9.485 area $\approx \frac{1}{2} \times 2 \times [5.243 + 9.485 + 2(7 + 8.348)]$ $= 45.4$ (3sf)	M1 A1 B1 M1 A1
	(ii)	$= \int_2^8 (1 + 3\sqrt{x}) dx$ $= [x + 2x^{\frac{3}{2}}]_2^8$ $= [8 + 2(2\sqrt{2})^3] - [2 + 2(2\sqrt{2})]$ $= (8 + 32\sqrt{2}) - (2 + 4\sqrt{2})$ $= 6 + 28\sqrt{2}$	M1 A1 M1 M1 A1
	(iii)	$= \frac{(6 + 28\sqrt{2}) - 45.4}{6 + 28\sqrt{2}} \times 100\% = 0.43\%$	M1 A1 (12)

9.	(i)	$r = \frac{x}{2}$ $\therefore u_3 = x \times \frac{x}{2} = \frac{1}{2}x^2$	M1 M1 A1
	(ii)	$a = 2, a + 2d = x$ $\therefore d = \frac{1}{2}(x - 2)$ $u_{11} = 2 + [10 \times \frac{1}{2}(x - 2)] = 5x - 8$	M1 M1 A1
	(iii)	$\frac{1}{2}x^2 = 5x - 8$ $x^2 - 10x + 16 = 0$ $(x - 2)(x - 8) = 0$ $x \neq 2 \therefore x = 8$	M1 M1 A1
	(iv)	$d = \frac{1}{2}(8 - 2) = 3$ $S_{50} = \frac{50}{2}[4 + (49 \times 3)] = 3775$	B1 M1 A1 (12)

Total (72)