RADIANS

1. (i) Area of R = Area of sector − Area of triangle

So,

$$22 = \frac{1}{2}.10^2.\theta - \frac{1}{2}.10\cos\theta.10\sin\theta$$

$$\Rightarrow 22 = 50\theta - 50\sin\theta\cos\theta$$

$$\Rightarrow 0.44 = \theta - \sin\theta\cos\theta$$

$$\Rightarrow \theta = 0.44 + \sin\theta\cos\theta.$$

(ii)

θ	0.9	1.0	
$0.44 + \sin\theta\cos\theta$	0.927	0.895	
$\theta - (0.44 + \sin\theta\cos\theta)$	−0.027	0.105	sign change indicates solution lies within bounds

2. (i) $l = r\theta$

$48 = 50\theta$

$\Rightarrow \underline{\theta = 0.96}$

(ii) $\pi^c = 180^\circ$

$\Rightarrow 1^c = \frac{180^\circ}{\pi}$

$0.96^c = 0.96 \times \frac{180}{\pi}$

$= \underline{55^\circ}$

3. (i) $l = r\theta$

$= 5 \times 0.8 = \underline{4\text{cm}}$

(ii) $A_S = \frac{1}{2}r^2\theta$

$= \frac{1}{2} \times 5^2 \times 0.8$

$= \underline{10\ \text{cm}^2}$

$A_\Delta = \frac{1}{2}r^2\sin\theta$

$= \frac{1}{2}5^2\sin 0.8$

$= 8.97\ \text{cm}^2$

Segment $= 10 - 8.97 = \underline{1.03\ \text{cm}^2}$

4. (i) $l = r\theta$

$46 = 20\theta$

$\theta = \underline{2.3}$

(ii) $A = \frac{1}{2}r^2\theta$

$= \frac{1}{2} \cdot 20^2 \cdot 2.3$

$= \underline{460\ \text{cm}^2}$

5. (i) Segment = Sector − Triangle

$$\frac{\pi r^2}{5} = \frac{1}{2}r^2\theta - \frac{1}{2}r^2\sin\theta$$

$$\Rightarrow \frac{2\pi r^2}{5} = r^2\theta - r^2\sin\theta$$

$$\Rightarrow \frac{2\pi}{5} = \theta - \sin\theta$$

$$\Rightarrow \theta = \frac{2\pi}{5} + \sin\theta$$