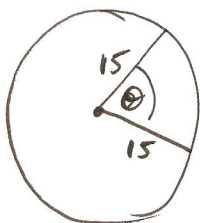


Scoil Mhuire V (14-15) - Problem Set 5 (Solutions)

$$\begin{aligned} \underline{\underline{1}} \quad 2\pi r &= 30\pi \\ 2r &= 30 \\ r &= 15 \end{aligned}$$



$$A = \frac{1}{2} r^2 \theta = 75$$

$$\frac{1}{2} (15)^2 \theta = 75$$

$$225\theta = 150$$

$$\theta = \frac{150}{225} = \frac{6}{9} = \frac{2}{3}$$

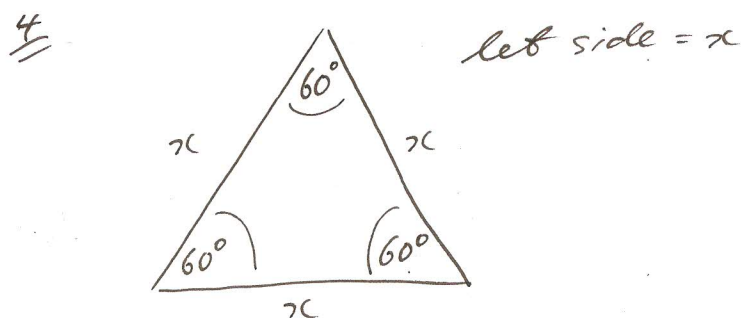
$$\begin{aligned} \underline{\underline{3}} \quad 3 \tan x &= \sqrt{3} \\ \tan x &= \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}} \\ \Rightarrow x &= \tan^{-1}\left(\frac{1}{\sqrt{3}}\right) = 30^\circ \\ \text{reference } x &= 30^\circ \end{aligned}$$

S	A ✓
T ✓	C

$$\begin{aligned} \Rightarrow x &= 30^\circ \\ \text{and} \\ x &= 180^\circ + 30^\circ = 210^\circ \end{aligned}$$

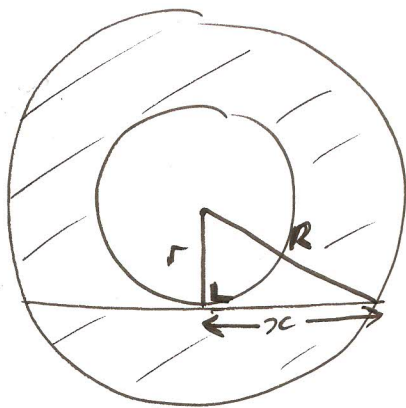
$$\begin{aligned} \underline{\underline{2}} \quad \text{Arc length} &= r\theta = 6 \\ r(0.75) &= 6 \\ \frac{3r}{4} &= 6 \\ r &= \frac{6(4)}{3} = 8 \text{ cm} \end{aligned}$$

$$\begin{aligned} A &= \frac{1}{2} r^2 \theta \\ &= \frac{1}{2} (8)^2 \frac{3}{4} \\ &= \frac{64(3)}{2(4)} \\ &= 24 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} A &= \frac{1}{2} ab \sin C = 4\sqrt{3} \\ \frac{1}{2} (x)(x) \sin 60^\circ &= 4\sqrt{3} \\ \frac{1}{2} (x^2) \frac{\sqrt{3}}{2} &= 4\sqrt{3} \\ \frac{\sqrt{3} x^2}{4} &= 4\sqrt{3} \\ x^2 &= 16 \\ x &= \sqrt{16} = 4 \text{ cm} \end{aligned}$$

5



Shaded Area

$$SA = \pi R^2 - \pi r^2$$

$$SA = \pi(R^2 - r^2)$$

Pythagorean's Theorem

$$R^2 = r^2 + x^2$$

$$R^2 - r^2 = x^2$$

$$\Rightarrow SA = \pi(R^2 - r^2)$$

$$= \pi x^2$$

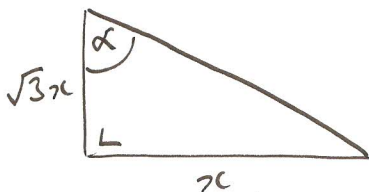
$$(ii) R \rightarrow 2x$$

$$\Rightarrow (2x)^2 = r^2 + x^2$$

$$4x^2 = r^2 + x^2$$

$$r^2 = 3x^2$$

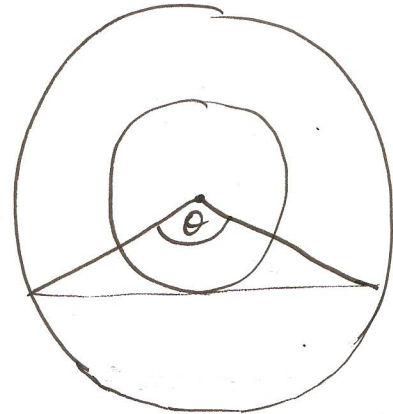
$$\Rightarrow r = \sqrt{3}x$$



$$\tan \alpha = \frac{x}{\sqrt{3}x} = \frac{1}{\sqrt{3}}$$

$$\alpha = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$$

$$\alpha = 30^\circ$$



$$SA = \text{Sector} - \text{Triangle}$$

$$= \frac{1}{2} r^2 \theta - \frac{1}{2} ab \sin C$$

$$= \frac{1}{2} (2x)^2 \frac{\pi}{3} - \frac{1}{2} (2x)(2x) \frac{\sqrt{3}}{2}$$

$$= \frac{2\pi x^2}{3} - \sqrt{3} x^2$$

$$= \left(\frac{2\pi}{3} - \sqrt{3}\right) x^2$$

$$6 // \quad 3x + y + z = 0 \quad \dots \textcircled{1}$$

$$x - y + z = 2 \quad \dots \textcircled{2}$$

$$2x - 3y - z = 9 \quad \dots \textcircled{3}$$

$$\textcircled{1} + \textcircled{3} : 5x - 2y = 9 \quad \dots \textcircled{4}$$

$$\textcircled{2} + \textcircled{3} : 3x - 4y = 11 \quad \dots \textcircled{5}$$

$$-10x + 4y = -18 \quad \textcircled{4} \times -2$$

$$3x - 4y = 11 \quad \textcircled{5}$$

$$-7x = -7$$

$$x = 1$$

$$y = -2$$

$$z = -1$$