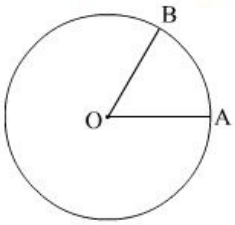
Areas Related to Circles Ex 15.2 Q20

Answer :

It is given that the radius of circle is r cm and angle $\angle AOB = \theta°$.



(i) We know that the arc length l of a sector of an angle θ in a circle of radius r is

$$l = \frac{\theta}{360°} \times 2\pi r$$

Perimeter of sector $AOB = OB + OA + arc$ length AB

Now we substitute the value of OB, OA and l to find the perimeter of sector AOB,

$$\text{Perimeter of sector } AOB = r + r + \frac{\theta}{360°} \times 2\pi r$$

$$50 = 2r\left(1 + \frac{\pi\theta}{360°}\right)$$

$$\frac{25}{r} = 1 + \frac{\pi\theta}{360°}$$

$$\frac{\pi\theta}{360°} = \frac{25}{r} - 1$$

$$\boxed{\theta = \frac{360°}{\pi}\left(\frac{25}{r} - 1\right)}$$

(ii) We know that area A of the sector at an angle θ in the circle of radius r is $A = \frac{\theta}{360^\circ} \times \pi r^2$. Thus

$$\text{Area of sector } AOB = \frac{\theta}{360°}\pi r^2$$

Substituting the value of θ,

$$A = \frac{\frac{360°}{\pi}\left(\frac{25}{r} - 1\right)}{360°}\pi r^2$$

$$A = \left(\frac{25}{r} - 1\right)r^2$$

$$\boxed{A = 25r - r^2}$$

Areas Related to Circles Ex 15.2 Q21

Answer :

Angle make by the minute hand in 1 minute = 6°

Angle make by the minute hand in 5 minute = 5 × 6° = 30°

Area of the sector having central angle is given by

$$\frac{30^\circ}{360^\circ}\pi(14)^2$$

$$= \frac{1}{12} \times \frac{22}{7}(14)^2$$

$$= 51.33 \text{ cm}^2$$

Hence, the area swept by minute hand in 5 minutes is 51.33 cm^2

Areas Related to Circles Ex 15.2 Q22

Answer :

Here, we have θ = 60° and r = 21 cm

(i) The length of the arc is given by

$$\frac{60^\circ}{360^\circ} \times 2\pi(21)$$

$$= \frac{1}{6} \times 2 \times \frac{22}{7} \times 21$$

$$= 22 \text{ cm}$$

(ii) Area of the sector formed by the arc is given by

$$\frac{60^\circ}{360^\circ} \pi(21)^2$$

$$= \frac{1}{6} \times \frac{22}{7} (21)^2$$

$$= 231 \text{ cm}^2$$

********** END **********