Areas Related to Circles Ex 15.2 Q17

Answer :

We know that the area A of a sector of circle at an angle θ of radius r is given by

$$A=\frac{\theta}{360^\circ}\pi r^2.$$

It is given that, Area of a sector $A=4.4\text{ cm}^2$ and angle $\theta=56^\circ$.

We can find the value of r by substituting these values in above formula,

$$A=\frac{56^\circ}{360^\circ}\times\frac{22}{7}r^2$$

$$4.4=\frac{56^\circ}{360^\circ}\times\frac{22}{7}r^2$$

$$r^2=\frac{360^\circ}{56^\circ}\times\frac{7}{22}\times 4.4$$

$$r^2=9$$

$$r=\sqrt{9}$$

$$r=\boxed{3\text{ cm}}$$

Areas Related to Circles Ex 15.2 Q18

Answer :

It is given that the radius of circle $r=6\text{ cm}$, length of chord $=10\text{ cm}$ and angle at the centre of circle $\theta=110^\circ$.

(i) We know that the Circumference C of circle of radius r is,

$$C=2\pi r$$

$$=2\times\frac{22}{7}\times 10$$

$$=\frac{440}{7}$$

$$C=\boxed{37.68\text{ cm}}$$

(ii) We know that the Area A of circle of radius r is,

$$A=\pi r^2$$

$$=\frac{22}{7}\times 6\times 6$$

$$=\frac{792}{7}$$

$$A=\boxed{113.1\text{ cm}^2}$$

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

$$l=\frac{110^\circ}{360^\circ}\times 2\times\frac{22}{7}\times 6$$

$$=\frac{110^\circ}{360^\circ}\times 37.68$$

$$=\boxed{11.51\text{ cm}}$$

(iv) We know that the area A of a sector of an angle θ in the circle of radius r is given by

$$A=\frac{\theta}{360^\circ}\times\pi r^2$$

$$=\frac{110^\circ}{360^\circ}\times\frac{22}{7}\times 6\times 6$$

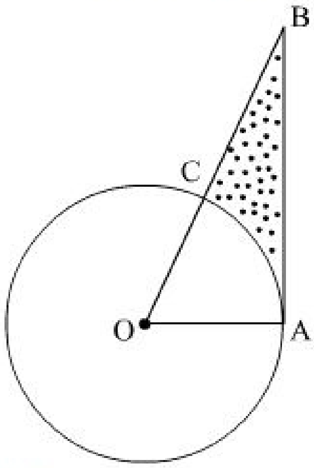
$$=\frac{110^\circ}{360^\circ}\times 113.1$$

$$=\boxed{34.5\text{ cm}^2}$$

Areas Related to Circles Ex 15.2 Q19

Answer :

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



In ΔAOB,

It is given that $OA = r$.

$$\cos\theta = \frac{OA}{OB}$$

$$OB = \frac{OA}{\cos\theta}$$

$$\boxed{OB = r\sec\theta}$$

$$\tan\theta = \frac{AB}{OA}$$

$$AB = OA\tan\theta$$

$$\boxed{AB = r\tan\theta}$$

(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 $AOC = OC + OA + arc$ length AB

Now we substitute the value of *OC*, *OA* and *l* to find the perimeter of sector *AOC*,

$$\text{Perimeter of sector } AOC = r + r + \frac{\theta}{360°}\times 2\pi r$$
$$= 2r + \frac{\theta}{180°}\times \pi r$$

$$\text{Perimeter of } \Delta AOB = OB + OA + AB$$
$$= r\sec\theta + r + r\tan\theta$$
$$= r\left(\sec\theta + \tan\theta + 1\right)$$

Perimeter of shaded region ABC = Perimeter of ΔAOB - Perimeter of sector AOC

$$= r\left(\sec\theta + \tan\theta + 1\right) - 2r - \frac{\theta}{180°}\times \pi r$$

$$= \boxed{r\left(\sec\theta + \tan\theta - \frac{\pi\theta}{180°} - 1\right)}$$

Hence, $\boxed{\text{Perimeter of shaded region } ABC = r\left(\sec\theta + \tan\theta - \frac{\pi\theta}{180°} - 1\right)}$

(ii) We know that area A of the sector at an angle θ in the circle of radius r is

$$A = \frac{\theta}{360°}\times \pi r^2.$$

Thus

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

$$\begin{aligned}\text{Area of } \Delta AOB &= \frac{1}{2}\times OA\times AB\\ &= \frac{1}{2}\times r\times r\tan\theta\\ &= \frac{1}{2}\times r^2\tan\theta\end{aligned}$$

$$\begin{aligned}\text{Area of shaded region } ABC &= \text{Area of } \Delta AOB - \text{Area of sector } AOC\\ &= \frac{1}{2}r^2\tan\theta - \frac{\theta}{360°}\times\pi r^2\\ &= \boxed{\frac{r^2}{2}\left(\tan\theta - \frac{\pi\theta}{180°}\right)}\end{aligned}$$

Hence, $\boxed{\text{Area of shaded region } ABC = \frac{r^2}{2}\left(\tan\theta - \frac{\pi\theta}{180°}\right)}$

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