



### Areas Related to Circles Ex 15.3 Q3

**Answer :**

We know that the area of minor segment of angle  $\theta$  in a circle of radius  $r$  is,

$$A = \left\{ \frac{\pi\theta}{360^\circ} - \sin \frac{\theta}{2} \cos \frac{\theta}{2} \right\} r^2$$

It is given that the chord of the circle of radius  $r = 14$  cm makes right angle at the centre.

So,  $\theta = 90^\circ$

Substituting the value of  $r$  and angle  $\theta$  in above formula,

Area of minor segment

$$\begin{aligned} A &= \left\{ \frac{90^\circ \pi}{360^\circ} - \sin \frac{90^\circ}{2} \cos \frac{90^\circ}{2} \right\} \times 14 \times 14 \\ &= \left\{ \frac{\pi}{4} - \sin 45^\circ \cos 45^\circ \right\} \times 196 \\ &= \frac{22 \times 196}{7 \times 4} - \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \times 196 \\ &= 154 - 98 \\ &= \boxed{56 \text{ cm}^2} \end{aligned}$$

Hence, area of minor segment is  $\boxed{56 \text{ cm}^2}$

Area of circle  $= \pi r^2$

$$\begin{aligned} &= \frac{22}{7} \times 14 \times 14 \\ &= 616 \text{ cm}^2 \end{aligned}$$

Area of major segment = Area of circle – Area of minor segment

$$= 616 - 56$$

$$= \boxed{560 \text{ cm}^2}$$

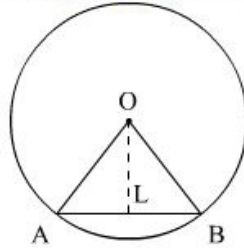
### Areas Related to Circles Ex 15.3 Q4

**Answer :**

We know that the area of minor segment of angle  $\theta$  in a circle of radius  $r$  is,

$$A = \left\{ \frac{\pi\theta}{360^\circ} - \sin \frac{\theta}{2} \cos \frac{\theta}{2} \right\} r^2$$

It is given that the chord AB divides the circle in two segments.



We have  $OA = 5\sqrt{2}$  cm and  $AB = 10$  cm . So,

$$\begin{aligned} AL &= \frac{AB}{2} \text{ cm} \\ &= \frac{10}{2} \text{ cm} \\ &= 5 \text{ cm} \end{aligned}$$

Let  $\angle AOB = 2\theta$ . Then,

$$\begin{aligned} \angle AOL &= \angle BOL \\ &= \theta \end{aligned}$$

In  $\triangle OLA$ , we have

$$\begin{aligned} \sin \theta &= \frac{AL}{OA} \\ &= \frac{5}{5\sqrt{2}} \\ &= \frac{1}{\sqrt{2}} \end{aligned}$$

$$\begin{aligned} \theta &= \sin^{-1} \frac{1}{\sqrt{2}} \\ &= 45^\circ \end{aligned}$$

Hence,  $\angle AOB = 90^\circ$

Now using the value of  $r$  and  $\theta$ , we will find the area of minor segment

$$\begin{aligned} A &= \left\{ \frac{90^\circ \pi}{360^\circ} - \sin \frac{90^\circ}{2} \cos \frac{90^\circ}{2} \right\} \times 5\sqrt{2} \times 5\sqrt{2} \\ &= \left\{ \frac{\pi}{4} - \sin 45^\circ \cos 45^\circ \right\} \times 50 \\ &= \frac{3.14 \times 50}{4} - \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \times 50 \\ &= 39.25 - 25 \end{aligned}$$

$$\boxed{A = 14.25 \text{ cm}^2}$$

Area of circle  $= \pi r^2$

$$\begin{aligned} &= 3.14 \times 5\sqrt{2} \times 5\sqrt{2} \\ &= 157.15 \text{ cm}^2 \end{aligned}$$

Area of major segment = Area of circle – Area of minor segment

$$= 157 - 14.25$$

$$= \boxed{142.75 \text{ cm}^2}$$

\*\*\*\*\* END \*\*\*\*\*