



NCERT Solutions For Class 10 Chapter 12 Maths Areas Related to Circles Exercise 12.2

Exercise 12.2

Unless stated otherwise, take $\pi = \frac{22}{7}$.

Q1. Find the area of a sector of a circle with radius 6 cm, if angle of the sector is 60° .

Ans. Here, $r = 6$ cm and $\theta = 60^\circ$

$$\begin{aligned}\text{Area of sector} &= \frac{\theta}{360^\circ} \times \pi r^2 \\ &= \frac{60^\circ}{360^\circ} \times \frac{22}{7} \times 6 \times 6 = \frac{132}{7} \text{ cm}^2\end{aligned}$$

Q2. Find the area of a quadrant of a circle whose circumference is 22 cm.

Ans. Given, $2\pi r = 22$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 22$$

$$\Rightarrow r = \frac{7}{2} \text{ cm}$$

We know that for quadrant of circle, $\theta = 90^\circ$

$$\begin{aligned}\therefore \text{Area of quadrant} &= \frac{\theta}{360^\circ} \times \pi r^2 \\ &= \frac{90^\circ}{360^\circ} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} = \frac{77}{8} \text{ cm}^2\end{aligned}$$

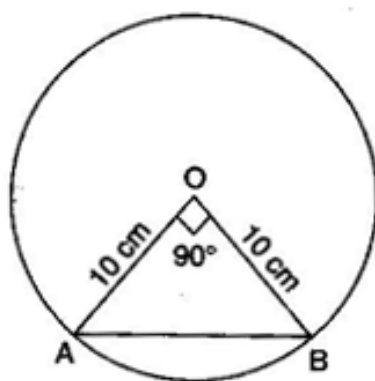
3. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

Ans. Here, $r = 14$ cm and $\theta = \frac{90^\circ}{3} = 30^\circ$

$$\begin{aligned}\therefore \text{Area swept} &= \frac{\theta}{360^\circ} \times \pi r^2 \\ &= \frac{30^\circ}{360^\circ} \times \frac{22}{7} \times 14 \times 14 = \frac{154}{3} \text{ cm}^2\end{aligned}$$

Q4. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding: (i) minor segment, (ii) major segment. (Use $\pi = 3.14$)

Ans. (i) Here, $r = 10$ cm and $\theta = 90^\circ$



$$\begin{aligned}\therefore \text{Area of minor sector} &= \frac{\theta}{360^\circ} \times \pi r^2 \\ &= \frac{90^\circ}{360^\circ} \times 3.14 \times 10 \times 10 = 78.5 \text{ cm}^2\end{aligned}$$

$$\text{Area of } \triangle OAB = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 10 \times 10 = 50 \text{ cm}^2$$

\therefore Area of minor segment = Area of minor sector
– Area of $\triangle OAB$

$$= 78.5 - 50 = 28.5 \text{ cm}^2$$

(ii) For major sector, radius = 10 cm and
 $\theta = 360^\circ - 90^\circ = 270^\circ$

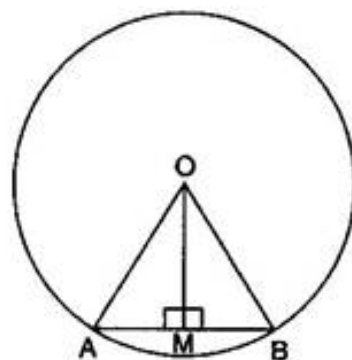
$$\therefore \text{Area of major sector} = \frac{\theta}{360^\circ} \times \pi r^2$$

$$= \frac{270^\circ}{360^\circ} \times 3.14 \times 10 \times 10 = 235.5 \text{ cm}^2$$

Q5. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find:

- (i) the length of the arc.
- (ii) area of the sector formed by the arc.
- (iii) area of the segment formed by the corresponding chord.

Ans. Given, $r = 21$ cm and $\theta = 60^\circ$



$$(i) \text{ Length of arc} = \frac{\theta}{360^\circ} \times 2\pi r$$

$$= \frac{60^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 21 = 22 \text{ cm}$$

$$(ii) \text{ Area of the sector} = \frac{\theta}{360^\circ} \times \pi r^2$$

$$= \frac{60^\circ}{360^\circ} \times \frac{22}{7} \times 21 \times 21 = 231 \text{ cm}^2$$

(iii) Area of segment formed by corresponding chord

$$= \frac{\theta}{360^\circ} \times \pi r^2 - \text{Area of } \triangle OAB$$

$$\Rightarrow \text{Area of segment} = 231 - \text{Area of } \triangle OAB \dots\dots\dots$$

(i)

In right angled triangle OMA and OMB,

OM = OB [Radii of the same circle]

OM = OM [Common]

$\therefore \triangle OMA \cong \triangle OMB$ [RHS congruency]

$\therefore AM = BM$ [By CPCT]

$\therefore M$ is the mid-point of AB and $\angle AOM = \angle BOM$

$$\Rightarrow \angle AOM = \angle BOM$$

$$= \frac{1}{2} \angle AOB = \frac{1}{2} \times 60^\circ = 30^\circ$$

Therefore, in right angled triangle OMA,

$$\cos 30^\circ = \frac{OM}{OA} \Rightarrow \frac{\sqrt{3}}{2} = \frac{OM}{21}$$

$$\Rightarrow OM = \frac{21\sqrt{3}}{2} \text{ cm}$$

$$\text{Also, } \sin 30^\circ = \frac{AM}{OA} \Rightarrow \frac{1}{2} = \frac{AM}{21}$$

$$\Rightarrow AM = \frac{21}{2} \text{ cm}$$

$$\therefore AB = 2 AM = 2 \times \frac{21}{2} = 21 \text{ cm}$$

$$\therefore \text{Area of } \triangle OAB = \frac{1}{2} \times AB \times OM$$

$$= \frac{1}{2} \times 21 \times \frac{21\sqrt{3}}{2} = \frac{441\sqrt{3}}{4} \text{ cm}^2$$

Using eq. (i),

Area of segment formed by corresponding chord

$$= \left(231 - \frac{441\sqrt{3}}{4} \right) \text{ cm}^2$$

Q6. A chord of a circle of radius 15 cm subtends an angle of 60° at the centre. Find the area of the corresponding segment of the circle.

(Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

Ans. Here, $r = 15$ cm and $\theta = 60^\circ$

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