

FlexiPrep

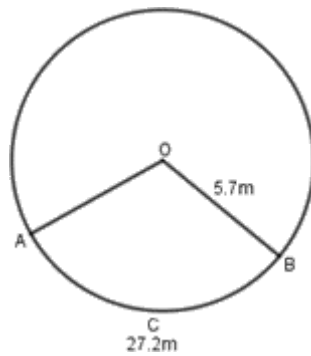
CBSE Class 10-Mathematics: Chapter – 12 Areas Related to Circles Part 17 (For CBSE, ICSE, IAS, NET, NRA 2022)

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Question 5:

The perimeter of a sector of a circle of radius $5.7m$ is $27.2m$. Calculate:

- (i) The length of arc of the sector in cm .
- (ii) The area of the sector in cm^2 correct to the nearest cm^2



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Answer:

Let O be the centre of a circle of radius $5.7m$ and $OACB$ be the given sector with perimeter $27.2m$.

Then $OA = OB = 5.7m$

Now, $OA + OB + \text{arc } AB = 27.2m$

$$\Rightarrow 5.7m + 5.7m + \text{arc } AB = 27.2m$$

$$\Rightarrow \text{arc } AB = 27.2 - 11.4 = 15.8m$$

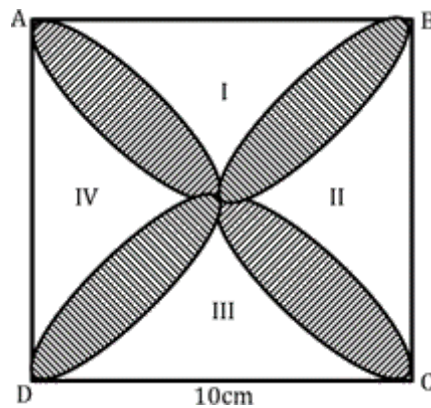
(i) Length of arc $AB = 15.8m$

$$\begin{aligned}
 \text{(ii) Area of sector OACB} &= \left(\frac{1}{2} \times \text{radius} \times \text{arc} \right) \\
 &= \left(\frac{1}{2} \times 5.7 \times 15.8 \right) \text{ cm}^2 \\
 &= 45.03 \text{ cm}^2
 \end{aligned}$$

Area of sector correct to nearest $\text{cm}^2 = 45 \text{ cm}^2$

Question 6:

Find the area of shaded region in the given figure where ABCD is a square of side 10 cm and semi-circles are drawn with each side of square as diameter. [$\pi = 3.14$]



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Answer:

Area of region I + II = area of ABCD – area of 2 semicircles of each radius 5 cm

$$\begin{aligned}
 &= 10 \times 10 - 2 \times \frac{1}{2} \times \pi \times 5^2 \\
 &= 100 - 25\pi = 100 - 25 \times 3.14 \\
 &= 21.5 \text{ cm}^2
 \end{aligned}$$

Similarly, area of III + area of IV = 21.5 cm^2

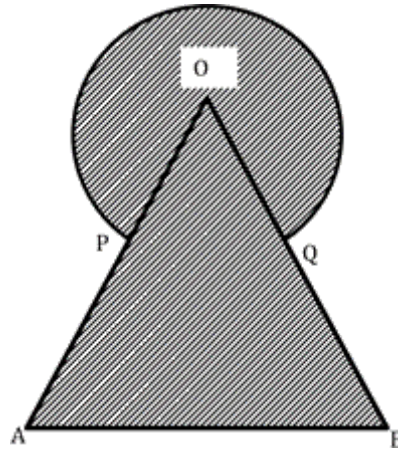
Area of region I, II, III, and IV = $2 \times 21.5 = 43 \text{ cm}^2$

Thus, area of shaded region = Area ABCD – Area of (I, II, III, IV)

$$= 100 - 43 = 57 \text{ cm}^2$$

Question 7:

Find the area of the shaded region where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



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Answer:

Area of shaded region

= Area of major sector OPLQO + Area of equilateral Δ OAB

$$= \frac{300}{360} \pi (6)^2 + \frac{\sqrt{3}}{4} (12)^2$$

$$= \frac{5}{6} \times \frac{22}{7} \times 36 + \frac{\sqrt{3}}{4} \times 144 = \left(\frac{660}{7} + 36\sqrt{3} \right) \text{ cm}^2$$