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CBSE Class 10- Mathematics: Chapter – 12 Areas Related to Circles Part 12

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Question 33:

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

Answer:

Circumference = 22 cm

$$2\pi r = 22$$

$$\Rightarrow r = \frac{22}{2\pi} = \frac{11}{\pi}$$

Quadrant of circle will subtend 90° angle at the centre of the circle.

Area of such quadrant of the circle = $\frac{90^\circ}{360^\circ} \times \pi \times r^2$

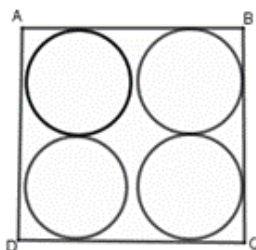
$$= \frac{1}{4\pi} \times \pi \times \left(\frac{11}{\pi}\right)^2$$

$$= \frac{121}{4\pi} = \frac{121 \times 7}{4 \times 22}$$

$$= \frac{77}{8}\text{ cm}^2$$

Question 34:

Find the area of the shaded region where ABCD is a square of side 14 cm .



Answer:

Area of square $ABCD = 14 \times 14\text{ cm}^2 = 196\text{ cm}^2$

$$\text{Diameter of each circle} = \frac{14}{2} = 7\text{ cm}$$

$$\therefore \text{Radius of each circle} = \pi r^2 = \frac{22}{7} \times \left(\frac{7}{2}\right)^2$$

$$\text{Area of circles} = 4 \times \frac{22}{7} \times \left(\frac{7}{2}\right)^2 = 154\text{ cm}^2$$

Area of shaded region = Area of square – Area of circles

$$= 196\text{ cm}^2 - 154\text{ cm}^2 = 42\text{ cm}^2$$

Question 35:

The radius of a circle is 20 cm . Three more concentric circles are drawn inside it in such a manner that it is divided into four parts of equal area. Find the radius of the largest of the three concentric circles.

Answer:

Let r be the radius of the largest of the three circles

$$\text{Area of largest circle} = \frac{3}{4} [\text{area of given circle}]$$

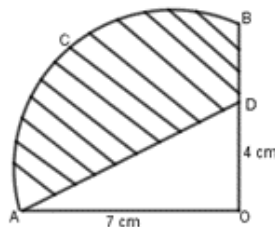
$$\therefore \pi r^2 = \frac{3}{4} \pi (20)^2$$

$$\Rightarrow r^2 = 300$$

$$\Rightarrow r = \sqrt{300} = 10\sqrt{3}$$

Question 36:

OACB is a quadrant of a circle with center O and radius 7 cm . If $OD = 4\text{ cm}$, then find area of shaded region.



Answer:

$$\text{Area of quadrant } OACB = \frac{90}{360} \pi (7)^2$$

$$= \frac{49}{4} \times \frac{22}{7} = \frac{77}{2} \text{ cm}^2$$

Area of shaded region = Area of quadrant

$OACB$ – area of $\triangle OAD$

$$= \frac{77}{2} - \frac{1}{2}(7 \times 4) = \frac{77}{2} - 14 = \frac{49}{2}$$

$$= 24.5 \text{ cm}^2$$

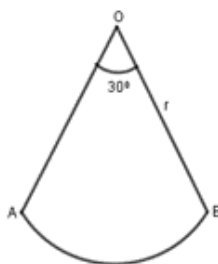
Question 37:

A pendulum swings through an angle of 30° and describes an arc 8.8 cm in length. Find the length of pendulum.

Answer:

Let l be the length of pendulum

$$\angle AOB = 30^\circ = \frac{\pi}{180^\circ} \times 30^\circ = \frac{\pi}{6}$$



$$\theta = \frac{l}{r}$$

$$\Rightarrow \frac{\pi}{6} = \frac{8.8}{r}$$

$$\Rightarrow r = \frac{8.8 \times 6}{\pi}$$

$$= 16.8 \text{ cm}$$