Exercise 7.2

Q. 1: Find θ, when:

(i) $l = 2cm, r = 3.5cm$

As we know

$$l = r\theta$$
$$\theta = \frac{l}{r}$$
$$\theta = \frac{2}{3.5}$$
$$\theta = 0.57 rad$$

(ii) $l = 4.5m, r = 2.5m$

As we know

$$l = r\theta$$
$$\theta = \frac{l}{r}$$
$$\theta = \frac{4.5}{2.5}$$
$$\theta = 1.8 rad$$

Q. 2: Find l, when:

(i) $\theta = 180^0, r = 4.9cm$

$$\theta = 180\left(\frac{\pi}{180}\right)$$
$$= \pi$$

As we know

$$l = r\theta$$
$$l = (4.9)(\pi)$$
$$l = 15.4cm$$

(ii) $\theta = 60^030', r = 15mm$

$$\theta = \left(60 + \frac{30}{60}\right)\left(\frac{\pi}{180}\right)$$
$$= (60 + 0.5)\left(\frac{\pi}{180}\right)$$
$$= (60.5)\left(\frac{\pi}{180}\right)$$
$$= 1.0559 rad$$

As we know

$$l = r\theta$$
$$l = (15)(1.0559)$$
$$l = 15.84mm$$

Q. 3: Find r, when:

(i) $l = 4cm, \theta = \frac{1}{4} radian$

As we know

$$l = r\theta$$

$$r = \frac{l}{\theta}$$
$$r = \frac{4}{1/4}$$
$$r = 16cm$$

(ii) $l = 52cm, \theta = 45^o$

$$\theta = (45)\left(\frac{\pi}{180}\right)$$
$$= 0.7854 \, radian$$

As we know

$$l = r\theta$$
$$r = \frac{l}{\theta}$$
$$r = \frac{52}{0.7854}$$
$$r = 66.21cm$$

Q. 4: **In a circle of radius 12m, find the length of an arc which subtends a central angle $\theta = 1.5 radian$.**

$\theta = 1.5 rad, r = 12m$

As we know

$$l = r\theta$$
$$l = (12)(1.5)$$
$$l = 18m$$

Q. 5: **In a circle of radius 10m, find the distance travelled by a point in moving on this circle if the point makes 3.5 revolutions.**

$\theta = 3.5 revolutions = 7\pi, r = 10m$

As we know

$$l = r\theta$$
$$l = (10)(7\pi)$$
$$l = 220m$$

Q. 6: **What is the circular measure of the angle between the hands of the watch at 3 o'clock?**

Full angle of a watch $= 2\pi$

Then,

Angle between two digits $= \frac{2\pi}{12}$

Angle b/w the hands of watch $= \frac{2\pi}{12} \times 3$

                                  $= \frac{\pi}{2} rad$

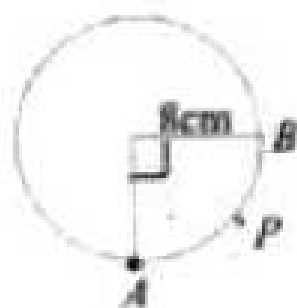**Q. 7:** **What is the length of the arc APB?**

From figure, we have

$$\theta = 90^o = \frac{\pi}{2}, r = 8cm$$

As we know

$$l = r\theta$$
$$l = (8)\left(\frac{\pi}{2}\right)$$
$$l = 12.57cm$$

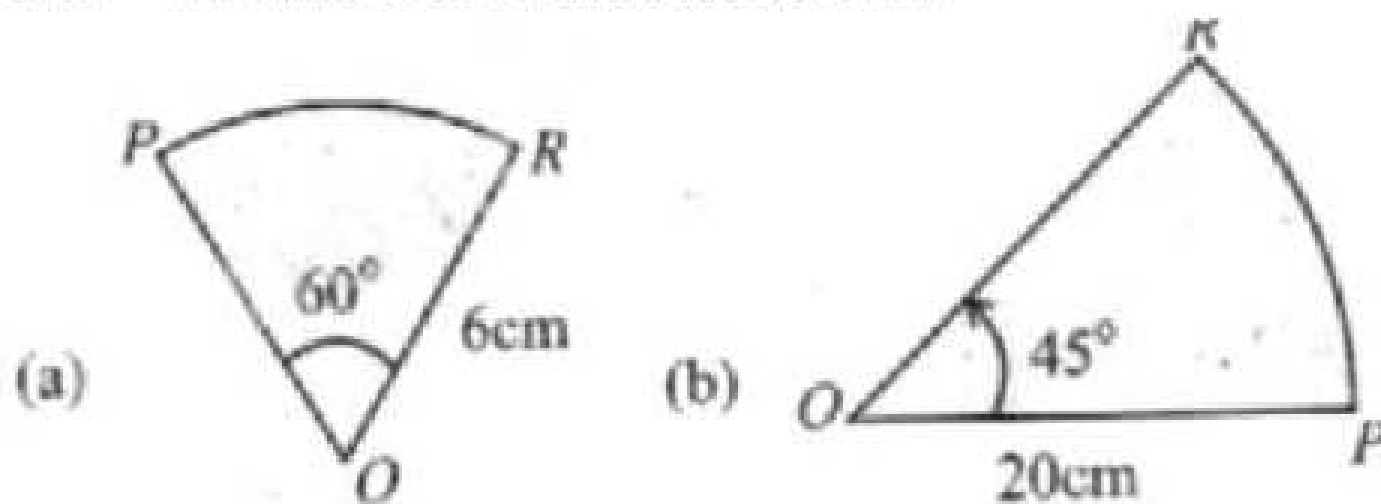**Q. 8:** In a circle of radius 12cm, how long an arc subtends a central angle of 84°.

$\theta = 84^o, r = 12cm$

$$\theta = (84)\left(\frac{\pi}{180}\right)$$
$$= 1.4661\, radian$$

As we know

Area of Arc $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(12)^2(1.4661)$$
$$= 105.56cm^2$$

Q. 9: Find the area of the sectors OPR.

(a)   (b)

(a) $\theta = 60^o, r = 6cm$

$$\theta = (60)\left(\frac{\pi}{180}\right)$$
$$= 1.0472\, radian$$

As we know

Area of Arc $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(6)^2(1.0472)$$
$$= 18.85cm^2$$

(b) $\theta = 45^o, r = 20cm$

$$\theta = (45)\left(\frac{\pi}{180}\right)$$
$$= 0.7854\, radian$$

As we know

Area of Arc $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(20)^2(0.7854)$$
$$= 157.08cm^2$$

Q. 10: Find area of the sector inside a central angle of 20° in a circle of radius 7m.
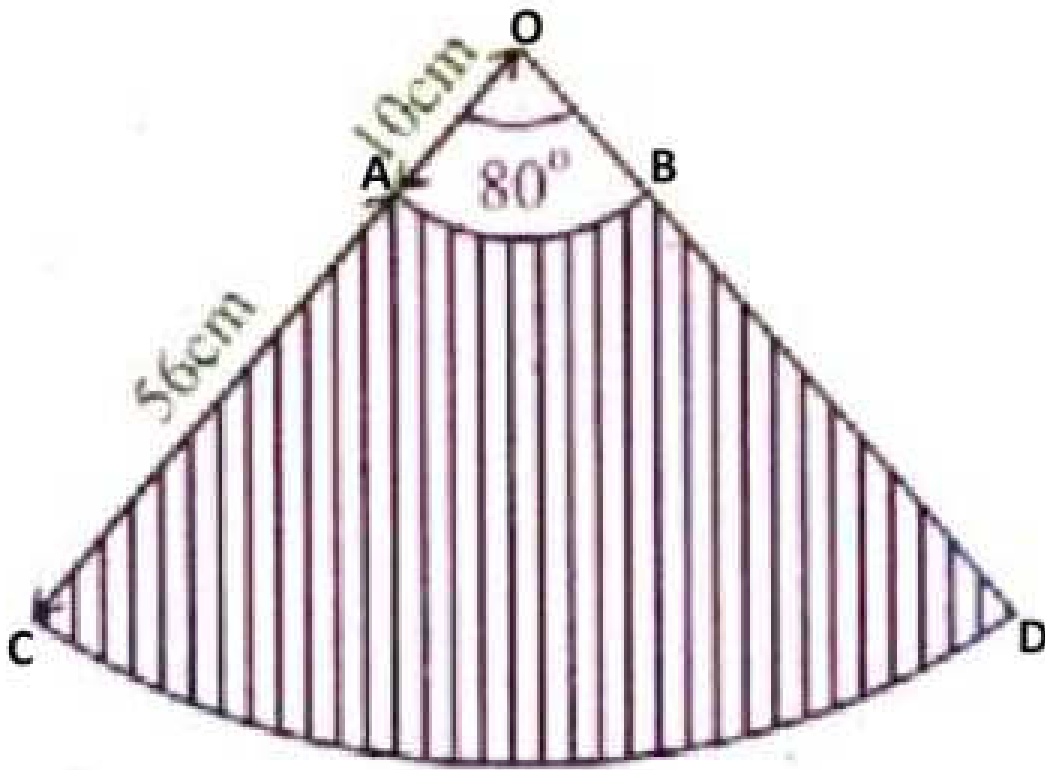
$\theta = 20^o, r = 7m$

$$\theta = (20)\left(\frac{\pi}{180}\right)$$
$$= 0.3491\, radian$$

As we know

Area of Arc $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(7)^2(0.3491)$$

$= 8.55 m^2$

Q. 11: Sehar is making a skirt. Each panel of this skirt is of the shape shown shaded in the diagram. How much material (cloth) is required for each panel?

We have labeled the diagram as shown in figure.

So, shaded Area ABCD = Area of Arc OCD – Area of Arc OAB ------------------ (i)

As θ is the same for both the Arcs, So

$$\theta = (80)\left(\frac{\pi}{180}\right)$$

$$= 1.3963 \, radian$$

For Arc OCD, we have

r = OA + AC = 10 + 56 = 66 cm

Area of Arc OCD $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(66)^2(1.3963)$$

$$= 3041.14 cm^2$$

For Arc OAB, we have

r = OA = 10 cm

Area of Arc OCD $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(10)^2(1.3963)$$

$$= 69.82 cm^2$$

Now from (i)

shaded Area ABCD = Area of Arc OCD – Area of Arc OAB

$$= 3041.14 - 69.82$$

$$= 2971.32 cm^2$$

Q. 12: Find the area of the sector with central angle of $\frac{\pi}{5}$ radian in a circle of radius 10cm.

$$\theta = \frac{\pi}{5}, r = 10cm$$

As we know

Area of Arc $= \frac{1}{2}r^2\theta$

$$= \frac{1}{2}(10)^2 \left(\frac{\pi}{5}\right)$$
$$= 31.42 cm^2$$

Q. 13: **The area of the sector with a central angle θ in a circle of radius 2m is 10 square meter. Find θ in radians.**

$Area = 10m^2, r = 2m$

As we know

Area of Arc	$= \frac{1}{2}r^2\theta$
10	$= \frac{1}{2}(2)^2\theta$
10	$= 2\theta$
θ	$= 5 radians$