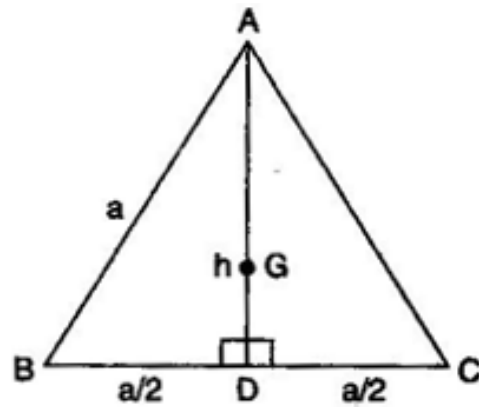




Exercise 12.3



$$= \pi(32)^2 - \frac{\sqrt{3}}{4} a^2 \dots\dots\dots(i)$$

\therefore G is the centroid of the equilateral triangle.

\therefore radius of the circumscribed circle $= \frac{2}{3} h$ cm

According to the question, $\frac{2}{3} h = 32$

$$\Rightarrow h = 48 \text{ cm}$$

$$\text{Now, } a^2 = h^2 + \left(\frac{a}{2}\right)^2$$

$$\Rightarrow a^2 = h^2 + \frac{a^2}{4}$$

$$\Rightarrow a^2 - \frac{a^2}{4} = h^2$$

$$\Rightarrow \frac{3a^2}{4} = h^2$$

$$\Rightarrow a^2 = \frac{4h^2}{3}$$

$$\Rightarrow a^2 = \frac{4(48)^2}{3} = 3072$$

$$\Rightarrow a = \sqrt{3072}$$

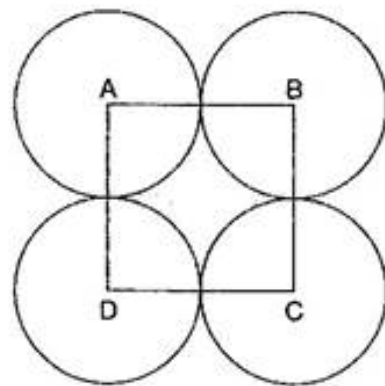
$$\therefore \text{Required area} = \pi(32)^2 - \frac{\sqrt{3}}{4} \times 3072 \quad [\text{From}$$

eq. (i)]

$$= \frac{22}{7} \times 1024 - 768\sqrt{3}$$

$$= \left(\frac{22528}{7} - 768\sqrt{3} \right) \text{cm}^2$$

Q7. In figure ABCD is a square of side 14 cm. With centers A, B, C and D, four circles are drawn such that each circle touches externally two of the remaining three circles. Find the area of the shaded region.



Ans. Area of shaded region = Area of square – 4
× Area of sector

$$= 14 \times 14 - 4 \times \frac{90^\circ}{360^\circ} \times \frac{22}{7} \times \left(\frac{14}{2} \right)^2$$

$$= 196 - \frac{22}{7} \times 7 \times 7 = 196 - 154 = 42 \text{ cm}^2$$

Q8. Figure depicts a racing track whose left and right ends are semicircular.



The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find:

- (i) the distance around the track along its inner edge.
- (ii) the area of the track.

Ans. (i) Distance around the track along its inner edge

$$= 106 + 106 + 2 \times \left[\frac{180^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times \left(\frac{60}{2} \right) \right]$$

$$= 212 + 60 \times \frac{22}{7} = 212 + \frac{1320}{7} = \frac{2804}{7} \text{ m}$$

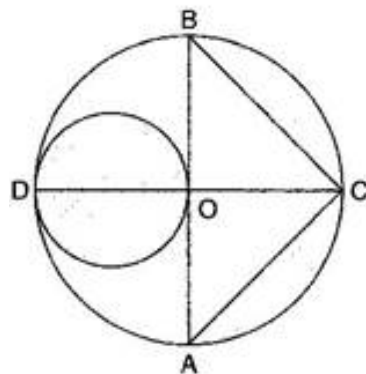
(ii) Area of track =

$$106 \times 10 + 106 \times 10 + 2 \times \left[\frac{1}{2} \times \frac{22}{7} (30 + 10)^2 - \frac{1}{2} \times \frac{22}{7} (30)^2 \right]$$

$$= 1060 + 1060 + \frac{22}{7} [(40)^2 - (30)^2]$$

$$= 2120 + \frac{22}{7} \times 700 = 4320 \text{ m}^2$$

Q9. In figure, AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If OA = 7 cm, find the area of the shaded region.



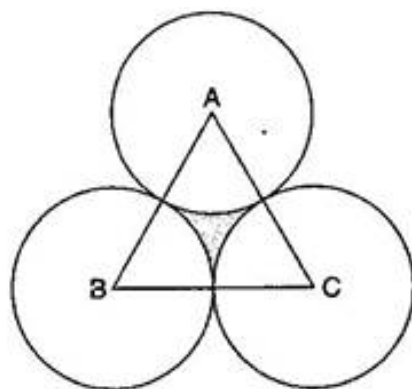
Ans. Area of shaded region = Area of circle + Area of semicircle ACB – Area of Δ ACB

$$= \frac{22}{7} \times \left(\frac{7}{2}\right)^2 + \frac{1}{2} \times \frac{22}{7} \times (7)^2 - \left(\frac{7 \times 7}{2} + \frac{7 \times 7}{2}\right)$$

$$= \frac{77}{2} + 187 - 49 = \frac{133}{2} = 66.5 \text{ cm}^2$$

Q10. The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle (see figure). Find the area of the shaded region.

(Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)



Ans. Area of equilateral triangle = $\frac{\sqrt{3}}{4} a^2 = 17320.5$

$$\Rightarrow a^2 = \frac{17320.5 \times 4}{\sqrt{3}}$$

$$\Rightarrow a^2 = \frac{17320.5 \times 4}{1.73205}$$

$$\Rightarrow a^2 = 40000$$

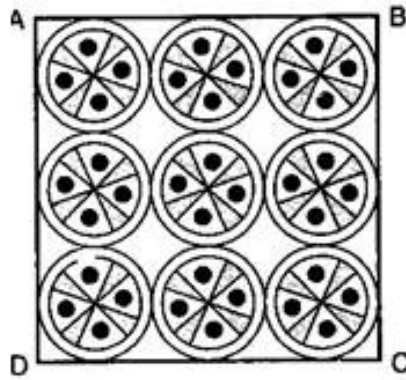
$$\Rightarrow a = 200 \text{ cm}$$

Area of shaded region = Area of

$$\Delta ABC - 3 \left[\frac{60^\circ}{360^\circ} \times 3.14 \times \left(\frac{200}{2} \right)^2 \right]$$

$$= 17320.5 - 15700 = 1620.5 \text{ cm}^2$$

Q11. On a square handkerchief, nine circular designs each of radius 7 cm are made (see figure). Find the area of the remaining portion of the handkerchief.

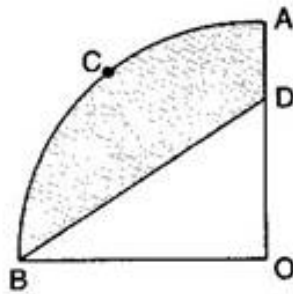


Ans. Area of remaining portion of handkerchief
 = Area of square ABCD – Area of 9 circular designs

$$= 42 \times 42 - 9 \times \frac{22}{7} \times 7 \times 7$$

$$= 1764 - 1386 = 378 \text{ cm}^2$$

Q12. In figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the:



- (i) quadrant OACB
- (ii) shaded region

Ans. (i) Area of quadrant OACB =

$$\frac{90^\circ}{360^\circ} \times \frac{22}{7} \times (3.5)^2$$

***** END *****