

$$r_1 = \left(\frac{7 \times 352}{44} \right)$$

$$r_1 = \left(\frac{2264}{44} \right)$$

$$r_1 = 56 \text{ cm}$$

But width of road = 7cm

Therefore, radius of outer circle is = $r_2 = r_1 + 7$

$$r_2 = 56 + 7$$

$$= 63 \text{ cm}$$

Step 2: Find the area of each circle in the given concentric circle:

Required area of road = area of outer circle - area of inner circle

$$= \pi r_2^2 - \pi r_1^2$$

$$= \pi (r_2^2 - r_1^2)$$

$$= \left(\frac{22}{7} \right) (63^2 - 56^2)$$

$$= \left(\frac{22}{7} \right) (63 - 56) \times (63 + 56)$$

$$= \left(\frac{22}{7} \right) (7 \times 119)$$

$$= (22) \times (119)$$

$$\text{Required area of road} = 2618 \text{ m}^2$$

Therefore, required area of road is 2618 m²

Question 2:

A race track is in the form of a ring whose inner and outer circumferences are 437 m and 503 m respectively. Find the width of the track and also its area.

Solution:

Step 1: Identify the radius of the circle from the given information:

Let the inner radius of the park be r m and outer radius R m.

Then, its

$$\text{Circumference} = 2\pi r \dots\dots\dots(1)$$

$$\text{but circumference} = 437 \dots\dots\dots(2)$$

Therefore, from equation (1) and equation (2)

$$\text{We get, } 2\pi r_1 = 437$$

$$2(3.14)r_1 = 437$$

$$r_1 = (437) \times (6.28)$$

$$r_1 = 69.5$$

$$r_1 = 69.5 \text{ m}$$

Therefore, radius of inner circle is 69.5 m.

Similarly, we get circumference = $2\pi R$ (3)

but

$$\text{Circumference} = 503 \text{(4)}$$

Therefore, From equation (3) and (4)

We get,

$$2\pi R = 437$$

$$2\left(\frac{22}{7}\right)R = 437$$

$$R = \left(\frac{7 \times 437}{44}\right)$$

$$R = \left(\frac{3521}{44}\right)$$

$$R = 80 \text{ cm}$$

Therefore, radius of inner circle is 80 m.

Step 2: Find the width of the concentric circle:

$$\text{Now, Width of the track} = R - r$$

$$\text{Width of the track} = 80 - 69.5$$

$$= 10.5$$

$$\text{Width of the track} = 10.5 \text{ m}$$

Step 3: Find the area of each circle in the given concentric circle:

Required area of track = area of outer circle – area of inner circle

$$= \pi R^2 - \pi r^2$$

$$= \pi(R^2 - r^2)$$

$$= \left(\frac{22}{7}\right)(80^2 - 69.5^2)$$

$$= \left(\frac{22}{7}\right) \times (80 - 69.5) \times (80 + 69.5)$$

$$= \left(\frac{22}{7}\right) \times (10.5) \times (149.5)$$

$$= (22) \times (224.25)$$

$$\text{Required area of track} = 4933.5 \text{ m}^2$$

Step 2: Find the circumference/area of resultant circle:

$$\begin{aligned}\text{Resultant Area of two circles} &= A_1 + A_2 \\ &= 64\pi + 36\pi \\ &= 100\pi\end{aligned}$$

Resultant Area of two circles is $100\pi \text{ cm}^2$

Step 3: Find the radius of the required circle:

Area of circle $= \pi R_r^2 = \text{Resultant Area of two circles}$

$$100\pi = \pi R_r^2$$

$$100 = R_r^2$$

Radius of the circle $R_r = 10$

Thus, radius of the circle $R = 10 \text{ cm}$.

Template 5: Find the area of minor and major sectors when angle of sector and radius are given.

Steps required to follow:

Step 1: Find the area of the minor sector:

Substitute the values of angle of sector (θ) and radius (r) in the area of sector formula $\frac{\theta}{360} \times \pi r^2$ and simplify it.

Step 2: Find the area of major sector when minor sector angle is given:

Find the area of the circle and subtract the area of the minor sector from it to find the area of major sector.

Substitute the values of angle of minor sector (θ) and radius (r) in area of major sector formula

$\frac{360-\theta}{360} \times \pi r^2$ to find the area of a major sector.

Question 1:

Find the area of the minor sector, when the radius of the circle is 14 cm and angle of sector is 60 degrees.

Solution:

Step 1: Find the area of the minor sector:

Given, Radius of circle (r) = 14 cm

Angle of sector (θ) = 60

Now, Area of sector $= \frac{\theta}{360} \times \pi r^2$

$$= \frac{60}{360} \times \pi (14)^2$$

Step 1: Find the radius of circle:

Given, circumference of circle = 198.

Circumference of circle = $2\pi r$

$$= 198$$

Therefore, radius $r = \left(\frac{198 \times 7}{2 \times 22} \right)$

$$r = 15.5 \text{ cm}$$

Radius = 15.5 cm

Step 2: Find the area of quadrant:

Area of circle = πr^2

$$= (3.14)(15.5)^2$$

$$= 754.38$$

Area of circle = 754.38 cm^2

Now

Required area of quadrant = $\frac{\text{area of circle}}{4}$

$$= \frac{754.38}{4}$$

$$= 188.6 \text{ cm}^2$$

Hence, area of quadrant is 188.6 cm^2 .

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Question 2:

The radius of a circle is 14 cm and circumference is equal to 88 cm . then find the area of the quadrant for the given circle.

Solution:

Step 1: Find the area of quadrant:

Given, radius of circle = 14 cm and

Circumference of circle = 88 cm

Now , Area of circle = πr^2

$$= (3.14)(14)^2$$

$$= 616$$

Thus, Area of circle = 616 cm^2