

CBSE Class-10 Mathematics
NCERT solution
Chapter - 12
Area Related to Circles - Exercise 12.1

Unless stated otherwise, take $\pi = \frac{22}{7}$

1. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.

Ans. Let R be the radius of the circle which has circumference equal to the sum of circumferences of the two circles, then according to question,

$$2\pi R = 2\pi(19) + 2\pi(9)$$

$$\Rightarrow 2\pi R = 2\pi(19 + 9)$$

$$\Rightarrow R = 19 + 9$$

$$\Rightarrow R = 28 \text{ cm}$$

2. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

Ans. Let R be the radius of the circle which has area equal to the sum of areas of the two circles, then

According to the question,

$$\pi R^2 = \pi(8)^2 + \pi(6)^2$$

$$\Rightarrow \pi R^2 = \pi \left[(8)^2 + (6)^2 \right]$$

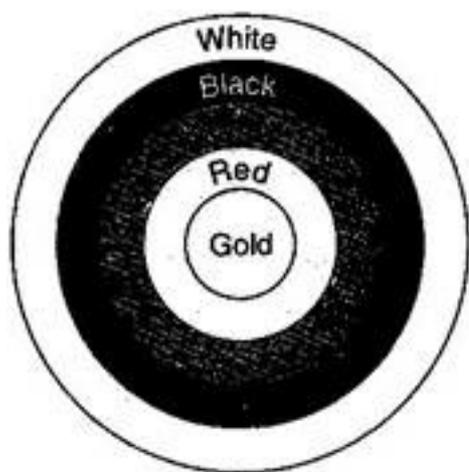
$$\Rightarrow R^2 = (8)^2 + (6)^2$$

$$\Rightarrow R^2 = 64 + 36$$

$$\Rightarrow R^2 = 100$$

$$\Rightarrow R = 10 \text{ cm}$$

3. Figure depicts an archery target marked with its five scoring areas from the centre outwards as Gold, Red, Blue, Black and White. The diameter of the region representing Gold score is 21 cm and each of the other bands is 10.5 cm wide. Find the area of the five scoring regions.



Ans. Gold: Diameter = 21 cm

$$\Rightarrow \text{Radius} = \frac{21}{2} \text{ cm}$$

$$\text{Area of gold scoring region} = \pi \left(\frac{21}{2} \right)^2$$

$$= \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 346.5 \text{ cm}^2$$

$$\text{Red: Area of red scoring region} = \pi \left(\frac{21}{2} + 10.5 \right)^2 - \pi \left(\frac{21}{2} \right)^2$$

$$= \pi (21)^2 - 346.5$$

$$= \frac{22}{7} \times 21 \times 21 - 346.5$$

$$= 1386 - 346.5 = 1039.5 \text{ cm}^2$$

Blue: Area of blue scoring region = $\pi(21 + 10.5)^2 - (1039.5 + 346.5)$

$$= \pi(31.5)^2 - 1386$$

$$= \frac{22}{7} \times 31.5 \times 31.5 - 1386$$

$$= 3118.5 - 1386 = 1732.5 \text{ cm}^2$$

Black: Area of black scoring region = $\pi(31.5 + 10.5)^2 - (1732.5 + 1039.5 + 346.5)$

$$= \pi(42)^2 - 3118.5$$

$$= \frac{22}{7} \times 42 \times 42 - 3118.5$$

$$= 5544 - 3118.5 = 2425.5 \text{ cm}^2$$

White: Area of white scoring region =

$$\pi(42 + 10.5)^2 - (2425.5 + 1732.5 + 1039.5 + 346.5)$$

$$= \pi(52.5)^2 - 5544$$

$$= \frac{22}{7} \times 52.5 \times 52.5 - 5544$$

$$= 8662.5 - 5544 = 3118.5 \text{ cm}^2$$

4. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

Ans. Diameter of wheel = 80 cm

\Rightarrow Radius of wheel (r) = 40 cm

$$\text{Distance covered by wheel in one revolution} = 2\pi r = 2 \times \frac{22}{7} \times 40 = \frac{1760}{7} \text{ cm}$$

$$\therefore \text{Distance covered by wheel in 1 hour} = 66 \text{ km} = 66000 \text{ m} = 6600000 \text{ cm}$$

$$\therefore \text{Distance covered by wheel in 10 minutes} = \frac{6600000}{60} \times 10 = 1100000 \text{ cm}$$

$$\therefore \text{No. of revolutions} = \frac{\text{Total distance}}{\text{distance of one revolution}}$$

$$= \frac{1100000 \times 7}{1760} = 4375$$

5. Tick the correct answer in the following and justify your choice: If the perimeter and area of a circle are numerically equal, then the radius of the circle is:

- (A) 2 units
- (B) π units
- (C) 4 units
- (D) 7 units

Ans. (A)

Circumference of circle = Area of circle

$$\Rightarrow 2\pi r = \pi r^2$$

$$\Rightarrow r = 2 \text{ units}$$