Q.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.

Sol. We have, $r_1 = 19$ cm $r_2 = 9$ cm

$\therefore$ Circumference of circle-I $= 2\pi r_1 = 2\pi (19)$ cm

Circumference of circle-II $= 2\pi r_1 = 2\pi (19)$ cm

Sum of the circumferences of circle-I and circle-II

$= 2\pi (19) + 2\pi (9) = 2\pi (19 + 9)$ cm $= 2\pi (28)$ cm

Let R be the radius of the circle-III.

$\therefore$ Circumference of circle-III $= 2\pi R$

According to the condition,

$2\pi R = 2\pi (28)$

$\Rightarrow R = \frac{2\pi(28)}{2\pi} = 28$ cm

Thus, the radius of the new circle = 28 cm.

Q.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.

Sol. We have,

Radius of circle-I, $r_1 = 8$ cm

$\therefore$ Area of circle-I $= \pi r_1^{\,2} = \pi(8)^2$ cm^2

Area of circle-II $= \pi r_2^2 = \pi(6)^2$ cm^2

Let the area of the circle-III be R

$\therefore$ Area of circle-III $= \pi r^2$

Now, according to the condition,

$\pi r_1^2 + \pi r_2^2 = \pi r^2$

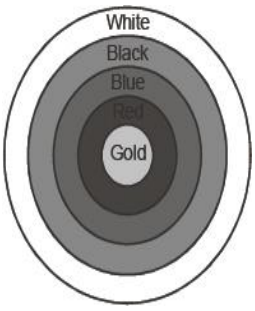
i.e. $\pi(8)^2 + \pi(6)^2 = \pi r^2 \Rightarrow \pi(8^2 + 6^2) = \pi r^2$

$\Rightarrow 8^2 + 6^2 = r^2 \Rightarrow 64 + 36 = r^2$

$\Rightarrow 100 = r^2 \Rightarrow 10^2 = r^2 \Rightarrow R = 10$

Thus, the radius of the new circle = 10 cm.

Q.3. Figure depicts an archery target marked with its five scoring regions 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 each of the five scoring regions.**Sol.** Diameter of the innermost region = 21 cm



Radius of the innermost (Gold Scoring) region $= \frac{21}{2} = 10.5$ cm

$\therefore$ Area of Gold region $= \pi (10.5)^2$ cm^2

$$= \frac{22}{7} \times \left(\frac{105}{10}\right)^2 \text{ cm}^2 = \frac{22}{7} \times \frac{105}{10} \times \frac{105}{10} \text{ cm}^2$$

$$= \frac{22 \times 15 \times 105}{100} \text{cm}^2 = 346.50 \text{ cm}^2$$

Area of the Red region $= \pi(10.5 + 10.5)^2 - \pi(10.5)^2$

$= \pi(21)^2 - \pi(10.5)^2$

$$= \pi[(21)^2 - (10.5)^2] = \frac{22}{7} [(21 + 10.5)(21 - 10.5)] \text{ cm}^2$$

$$= \frac{22}{7} \times 31.5 \times 10.5 \text{ cm}^2 = 22 \times \frac{315}{10} \times \frac{15}{10} \text{ cm}^2 = 1039.5 \text{ cm}^2$$

Area of Blue region $= \pi[(21 + 10.5)^2 - (21)^2] \text{ cm}^2$

$$= \frac{22}{7}[(31.5)^2 - (21)^2] \text{ cm}^2 = \frac{22}{7}[(31.5 + 21)(31.5 - 21)] \text{ cm}^2$$

$$= \frac{22}{7} \times 52.5 \times 10.5 \text{ cm}^2 = 22 \times \frac{75}{10} \times \frac{105}{10} \text{ cm}^2 = 1732.5 \text{ cm}^2$$

Area of Black region $= [(31.5 + 10.5)^2 - (31.5)^2] \text{ cm}^2$

$$= \frac{22}{7} [(42)^2 - (3.15)^2] \text{ cm}^2 = \frac{22}{7} \times [(42 - 31.5)(42 + 31.5)] \text{ cm}^2$$

$$= \frac{22}{7} \times 10.5 \times 73.5 \text{ cm}^2 = 22 \times \frac{15}{10} \times \frac{735}{10} \text{ cm}^2 = 2425.5 \text{ cm}^2$$

Area of White region $= \pi[(42 + 10.5)^2 = (42)^2] \text{ cm}^2$

$= \pi [(52.5)^2 - (42)2 \text{ cm}^2 = \pi[(52.5 + 42) \times (52.5 - 42)]]$

$$= \frac{22}{7} \times 94.5 \times 10.5 = 22 \times \frac{945}{10} \times \frac{15}{10} = 3118.5 \text{ cm}^2.$$

Q.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?

Sol. Diameter of a wheel = 80 cm

$\therefore$ Radius of the wheel $= \frac{80}{2} = 40$ cm

$\therefore$ Circumference of the wheel

$$= 2\pi \times 40 = 2 \times \frac{22}{7} \times 40 \text{ cm}$$

$\Rightarrow$ Distance covered by a wheel in one revolution $= \frac{2 \times 22 \times 40}{7}$ cm

Distance travelled by the car in 1hr

= 66 km = 66 × 1000 × 100 cm

$\therefore$ Distance travelled in 10 minutes

$$= \frac{66 \times 1000 \times 100}{60} \times 10 \text{ cm} = 11 \times 100000 \text{ cm}$$

Now,

Number of revolutions

$$= \frac{[\text{Distance travelled in 10 minutes}]}{[\text{Distance travelled in one revolution}]}$$

$$= \frac{[1100000]}{\left[\frac{2 \times 22 \times 40}{7}\right]} = \frac{1100000 \times 7}{2 \times 22 \times 40} = 4375$$

Thus, the required number of revolutions = 4375.

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

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

Sol. We have:

[Numerical area of the circle] = [Numerical circumference of the circle]

$\Rightarrow \pi r_2 = 2\pi r$

$\Rightarrow \pi r_2 - 2\pi r = 0 \Rightarrow r_2 - 2r = 0$

$\Rightarrow r(r - 2) = 0 \Rightarrow r = 0$ or $r = 2$

But r cannot be zero

$\therefore r = 2$ units.

Thus, the option (A) 2 units is correct.