Areas Related to Circles: Exercise 12.1

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 circumference of the two circles.

Sol. Suppose, r is the radius of the circle which has circumference is equal to the sum of the circumference of two circles of radii 19 cm and 9 cm.

So, sum of the circumference, $2\pi r = 2\pi (19) + 2\pi (9)$

$\Rightarrow r = 19 + 9 = 28$

Thus, the radius of the new circles, r = 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 area of the two circles.

Sol. Suppose, r is the radius of the circle having area equal to the sum of the area of the circles of radii 8 cm and 6 cm.

So, area of the circle, $\pi r^2 = \pi(8)^2 + \pi(6)^2$

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

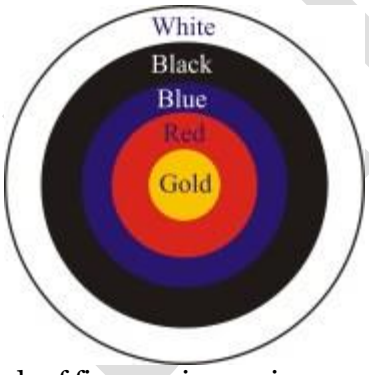
$\Rightarrow r^2 = 64 + 36$

$\Rightarrow r^2 = 100$

$\Rightarrow r = 10$

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

Q.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 reach of the other bands is 10.5 cm wide.
Find the area of each of the five scoring regions.



Sol. The area of each of five scoring regions are as under :

(i) Gold: Diameter = 21 cm, radius = 10.5 cm

Area = $\pi (10.5)^2$ cm^2

= $(22/7) \times 110.25$ cm^2

= $(2425.5/7)$ cm^2

=346.5cm^2

(ii) Red: radius = 10.5 + 10.5 = 21 cm

Area = $\pi [(21)^2 - (10.5)^2]$ cm^2

= $(22/7)$ (441−110.25)cm^2

= $(7276.5/7)$ cm^2

=1039.5cm^2

(iii) Blue: radius = 21 +10.5 = 31.5 cm

Area = $\pi [(31.5)^2 - (21)^2]$ cm^2

= $(22/7)$ (992.25−441) cm^2

= $(12127.5/7)$ cm^2 = 1732.5cm^2

(iv) Black: radius = 31.5 +10.5 = 42 cm

Area = $\pi [(42)^2 - (31.5)^2]$ cm^2

= (22/7) (1764 – 992.25) cm^2
= (22/7) × 771.75cm^2
=16978.5/7 cm^2
= 2425.5cm^2

(v) White: radius = 42 + 10.5 = 52.5cm

Area = π [$(52.5)^2$ – $(42)^2$] cm^2
= (22/7) (2756.25–1764) cm^2
= (22/7) × 992.25cm^2
= (21829.5/7) cm^2
= 3118.5cm^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. Distance travelled by the car in 10 min: speed x time

$$= \left(\frac{66x1000x100x10}{60}\right)cm$$

= 1100000 cm

Since, circumference of the wheel of the car = 2 π r
= (2 × (22/7) × 40) cm

So, no. of revolutions in 10 min = (1100000 × 72 × 22 × 40)
= 4375

Thus, the wheel of car makes 4375 revolutions in 10 minutes.

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 units **(d) 7 units**

Sol. Given: the perimeter and the area of a circle are numerically equal.

$2\pi r = \pi r^2$, where r is the radius
$\Rightarrow r^2 - 2r = 0$
$\Rightarrow r(r - 2) = 0$
$\Rightarrow r = 0$ or $r = 2$

Since, $r \neq 0$, so r = 2 units

Correct Option: (a)

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