EXERCISE: 12.1 (PAGE NO: 230)

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

Solution:

The radius of the 1st circle = 19 cm (given)

∴ circumference of the 1st circle = $2\pi \times 19 = 38\pi$ cm

The radius of the 2nd circle = 9 cm (given)

∴ circumference of the 2nd circle = $2\pi \times 9 = 18\pi$ cm

So,

The sum of the circumference of two circles = $38\pi + 18\pi = 56\pi$ cm

Now, let the radius of the 3rd circle = R

∴ the circumference of the 3rd circle = $2\pi R$

It is given that sum of the circumference of two circles = circumference of the 3rd circle

Hence, $56\pi = 2\pi R$

Or, R = 28 cm.

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

Solution:

The radius of 1st circle = 8 cm (given)

∴ area of 1st circle = $\pi(8)^2 = 64\pi$

The radius of 2nd circle = 6 cm (given)

∴ area of 2nd circle = $\pi(6)^2 = 36\pi$

So,

The sum of 1st and 2nd circle will be = $64\pi + 36\pi = 100\pi$

Now, assume that the radius of 3rd circle = R

∴ area of the circle 3rd circle = πR^2

It is given that the area of the circle 3rd circle = Area of 1st circle + Area of 2nd circle

Or, $\pi R^2 = 100\pi cm^2$

$R^2 = 100cm^2$

So, R = 10cm

3. Fig. 12.3 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 the 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.

Solution:

The radius of 1st circle, $r_1 = 21/2$ cm (as diameter D is given as 21 cm)

So, area of gold region = $\pi r_1^2 = \pi(10.5)^2 = 346.5\ cm^2$

Now, it is given that each of the other bands is 10.5 cm wide,

So, the radius of 2nd circle, $r_2 = 10.5cm+10.5cm = 21$ cm

Thus,

∴ area of red region = Area of 2nd circle − Area of gold region = $(\pi r_2^2 – 346.5)\ cm^2$

$= (\pi(21)^2 − 346.5)\ cm^2$

= 1386 − 346.5

$= 1039.5\ cm^2$

Similarly,

The radius of 3rd circle, $r_3 = 21\ cm+10.5\ cm = 31.5$ cm

The radius of 4th circle, $r_4 = 31.5\ cm+10.5\ cm = 42$ cm

The Radius of 5th circle, $r_5 = 42\ cm+10.5\ cm = 52.5$ cm

For the area of nth region,

A = Area of circle n – Area of the circle (n-1)

∴ area of the blue region (n=3) = Area of the third circle – Area of the second circle

= $\pi(31.5)^2$ – 1386 cm^2

= 3118.5 – 1386 cm^2

= 1732.5 cm^2

∴ area of the black region (n=4) = Area of the fourth circle – Area of the third circle

= $\pi(42)^2$ – 1386 cm^2

= 5544 – 3118.5 cm^2

= 2425.5 cm^2

∴ area of the white region (n=5) = Area of the fifth circle – Area of the fourth circle

= $\pi(52.5)^2$ – 5544 cm^2

= 8662.5 – 5544 cm^2

= 3118.5 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?

Solution:

The radius of car's wheel = 80/2 = 40 cm (as D = 80 cm)

So, the circumference of wheels = $2\pi r = 80\ \pi$ cm

Now, in one revolution, the distance covered = circumference of the wheel = 80 π cm

It is given that the distance covered by the car in 1 hr = 66km

Converting km into cm, we get,

Distance covered by the car in 1hr = (66×10^5) cm

In 10 minutes, the distance covered will be = $(66\times10^5\times10)/60$ = 1100000 cm/s

∴ distance covered by car = 11×10^5 cm

Now, the no. of revolutions of the wheels = (Distance covered by the car/Circumference of the wheels)

=(11×10^5)/80 π = 4375.

5. Tick the correct solution 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

Solution:

Since the perimeter of the circle = area of the circle,

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

Or, $r = 2$

So, option (A) is correct, i.e., the radius of the circle is 2 units.