# EXERCISE 11.3

**Find the radius of a circle whose circumference is equal to the sum of the circumferences of two circles of radii 15 cm and 18 cm.**

**Solution:**

Radius of first circle = $r_1$ = 15 cm
Radius of second circle = $r_2$ = 18 cm
∴ Circumference of first circle = $2\pi r_1 = 30\pi$ cm
Circumference of second circle = $2\pi r_2 = 36\pi$ cm
Let the radius of the circle = R
According to the question,
Circumference of circle = Circumference of first circle + Circumference of second circle
$2\pi R = 2\pi r_1 + 2\pi r_2$
$\Rightarrow 2\pi R = 30\pi + 36\pi$
$\Rightarrow 66\pi \Rightarrow R = 33$
⇒ Radius = 33 cm
Hence, required radius of a circle is 33 cm.

**1. In Fig. 11.5, a square of diagonal 8 cm is inscribed in a circle. Find the area of the shaded region.**

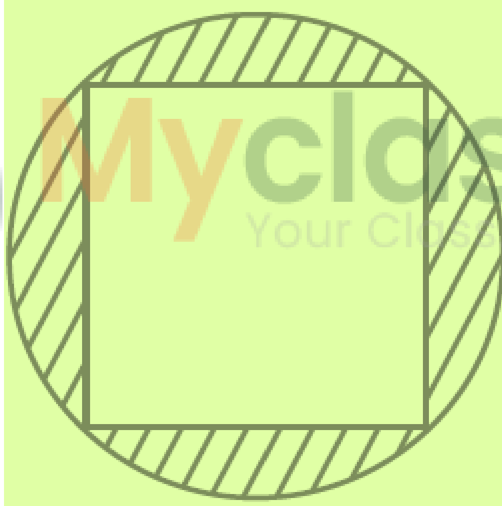


Fig.11.5

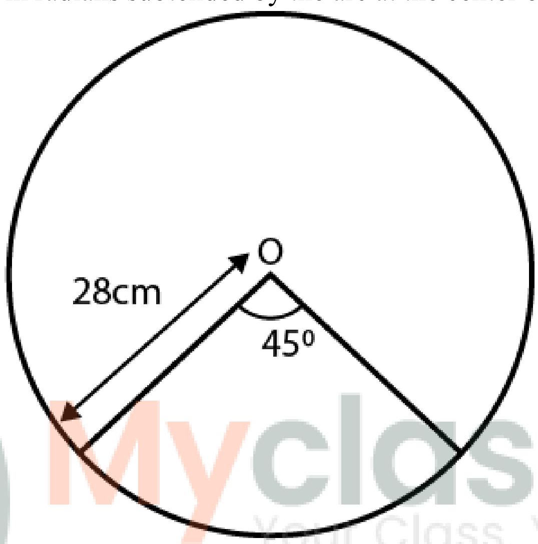


**Solution:**

Let a be the side of square.
∴ Diameter of a circle = Diagonal of the square = 8 cm
In right angled triangle ABC,
Using Pythagoras theorem,
$(AC)^2 = (AB)^2 + (BC)^2$
$\therefore (8)^2 = a^2 + a^2$
$\Rightarrow 64 = 2a^2$
$\Rightarrow a^2 = 32$
Hence,
area of square = $a^2 = 32$ $cm^2$
∴ Radius of the circle = Diameter/2 = 4 cm

∴ Area of the circle = $\pi r^2 = \pi(4)^2 = 16$ $cm^2$
Therefore, the area of the shaded region = Area of circle – Area of square
The area of the shaded region = $16\pi - 32$
= $16 \times (22/7) - 32$
= 128/7
= 18.286 $cm^2$

**2. Find the area of a sector of a circle of radius 28 cm and central angle 45°.**
**Solution:**
Area of a sector of a circle = $(1/2)r^2\theta$,
(Here r = radius and θ = angle in radians subtended by the arc at the center of the circle)






Here, Radius of circle = 28 cm
Angle subtended at the center = 45°
Angle subtended at the center (in radians) = θ $45\pi/180 = \pi/4$
∴ Area of a sector of a circle = $½ r^2\theta$
= $½ \times (28)^2 \times (\pi/4)$
= $28 \times 28 \times (22/8\times7)$
= 308 $cm^2$
Hence, the required area of a sector of a circle is 308 $cm^2$.

**3. The wheel of a motor cycle is of radius 35 cm. How many revolutions per minute must the wheel make so as to keep a speed of 66 km/h?**
**Solution:**
Radius of wheel = r = 35 cm
1 revolution of the wheel = Circumference of the wheel
= $2\pi r$
= $2 \times (22/7) \times 35$
= 220 cm
But, given that,
Speed of the wheel = 66 km/hr
= $(66\times1000\times100)/60$ cm/min
= 110000 cm/min
∴ Number of revolutions in 1 min = 110000/220 = 500
Hence, required number of revolutions per minute is 500.

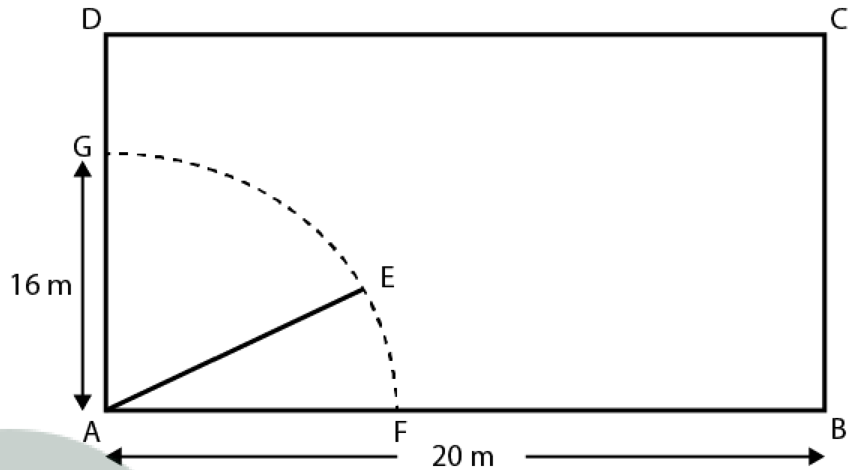
**4. A cow is tied with a rope of length 14 m at the corner of a rectangular field of dimensions 20m × 16m. Find the area of the field in which the cow can graze.**

**Solution:**

Let ABCD be a rectangular field.

Length of field = 20 m

Breadth of the field = 16 m




According to the question,

A cow is tied at a point A.

Let length of rope be AE = 14 m = *l*.

Angle subtended at the center of the sector = 90°

Angle subtended at the center (in radians) $\theta = 90\pi/180 = \pi/2$

$\therefore$ Area of a sector of a circle = $\frac{1}{2} r^2\theta$

$= \frac{1}{2} \times (14)^2 \times (\pi/2)$

$= 154\ m^2$

Hence, the required area of a sector of a circle is $154\ m^2$.



**5. Find the area of the flower bed (with semi-circular ends) shown in Fig. 11.6.**

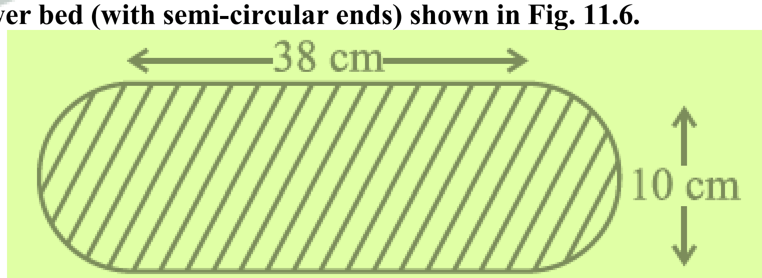



Fig. 11.6

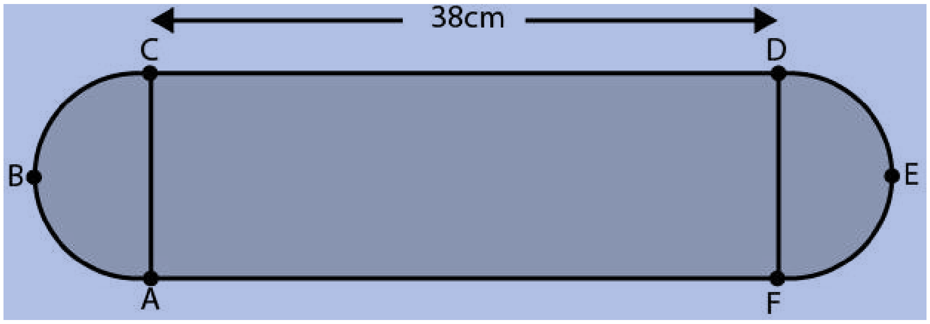
**Solution:**

According to the given figure,

Length and breadth of the rectangular portion AFDC of the flower bed are 38 cm and 10 cm respectively.

We know that,

Area of the flower bed = Area of the rectangular portion + Area of the two semi-circles.




∴ Area of rectangle AFDC = Length × Breadth
= 38 × 10 = 380 $cm^2$
Both ends of flower bed are semi-circle in shape.
∴ Diameter of the semi-circle = Breadth of the rectangle AFDC = 10 cm
∴ Radius of the semi circle = 10/2 = 5 cm
Area of the semi-circle = $\pi r^2/2 = 25\pi/2$ $cm^2$
Since there are two semi-circles in the flower bed,
∴ Area of two semi-circles = $2 \times (\pi r^2/2) = 25\pi$ $cm^2$
Total area of flower bed = $(380 + 25\pi)$ $cm^2$

**6. In Fig. 11.7, AB is a diameter of the circle, AC = 6 cm and BC = 8 cm. Find the area of the shaded region (Use π= 3.14).**

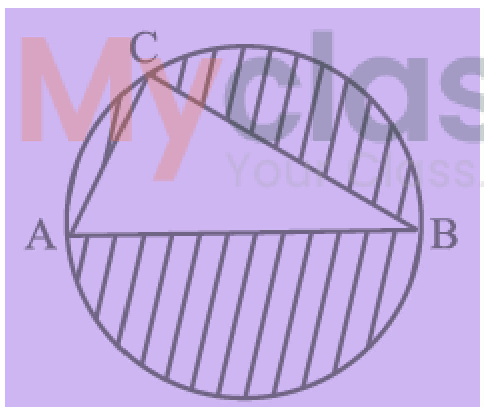



Fig. 11.7

**Solution:**

According to the question,
AC = 6cm and BC = 8 cm
A triangle in a semi-circle with hypotenuse as diameter is right angled triangle.
Using Pythagoras theorem in right angled triangle ACB,
$(AB)^2 = (AC)^2 + (CB)^2$
$(AB)^2 = (6)^2 + (8)^2$
$\Rightarrow (AB)^2 = 36 + 64$
$\Rightarrow (AB)^2 = 100 \Rightarrow (AB) = 10$
∴ Diameter of the circle = 10 cm
Thus, Radius of the circle = 5 cm
Area of circle = $\pi r^2$
$= \pi(5)^2$
$= 25\pi$ $cm^2$

$= 25 \times 3.14\ cm^2$
$= 78.5\ cm^2$
We know that,
Area of the right angled triangle = ( ½ ) × Base × Height
= (½) × AC × CB
= (½) × 6 × 8
$= 24\ cm^2$
Now, Area of the shaded region = Area of the circle – Area of the triangle
$= (78.5-24) cm^2$
$= 54.5 cm^2$