



Exercise 20F

Length of the wire = Circumference of the circle

$$\Rightarrow \text{Circumference of the circle} = 2\pi r = \left(2 \times \frac{22}{7} \times 28\right) \text{ cm} = 176 \text{ cm}$$

Let the wire be bent into the form of a square of side a cm.

Perimeter of the square = 176 cm

$$\Rightarrow 4a = 176$$

$$\Rightarrow a = \left(\frac{176}{4}\right) \text{ cm} = 44 \text{ cm}$$

Thus, each side of the square is 44 cm.

$$\begin{aligned} \text{Area of the square} &= (\text{Side})^2 = (a)^2 = (44 \text{ cm})^2 \\ &= 1936 \text{ cm}^2 \end{aligned}$$

$$\therefore \text{Required area of the square formed} = 1936 \text{ cm}^2$$

Q11

Answer :

Area of the acrylic sheet = 34 cm \times 24 cm = 816 cm²

Given that the diameter of a circular button is 3.5 cm.

$$\therefore \text{Radius of the circular button } (r) = \left(\frac{3.5}{2}\right) \text{ cm} = 1.75 \text{ cm}$$

$$\begin{aligned} \therefore \text{Area of 1 circular button} &= \pi r^2 \\ &= \left(\frac{22}{7} \times 1.75 \times 1.75\right) \text{ cm}^2 \\ &= 9.625 \text{ cm}^2 \end{aligned}$$

$$\therefore \text{Area of 64 such buttons} = (64 \times 9.625) \text{ cm}^2 = 616 \text{ cm}^2$$

$$\begin{aligned} \text{Area of the remaining acrylic sheet} &= (\text{Area of the acrylic sheet} - \text{Area of 64 circular buttons}) \\ &= (816 - 616) \text{ cm}^2 = 200 \text{ cm}^2 \end{aligned}$$

Q12

Answer :

Area of the rectangular ground = 90 m \times 32 m = (90 \times 32) m² = 2880 m²

Given:

Radius of the circular tank (r) = 14 m

$$\begin{aligned} \therefore \text{Area covered by the circular tank} &= \pi r^2 = \left(\frac{22}{7} \times 14 \times 14\right) \text{ m}^2 \\ &= 616 \text{ m}^2 \end{aligned}$$

\therefore Remaining portion of the rectangular ground for turfing = (Area of the rectangular ground - Area covered by the circular tank)

$$= (2880 - 616) \text{ m}^2 = 2264 \text{ m}^2$$

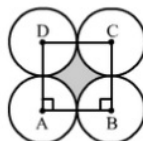
Rate of turfing = Rs 50 per sq. metre

$$\therefore \text{Total cost of turfing the remaining ground} = \text{Rs } (50 \times 2264) = \text{Rs } 1,13,200$$

Q13

Answer :

Area of each of the four quadrants is equal to each other with radius 7 cm.



$$\text{Area of the square ABCD} = (\text{Side})^2 = (14 \text{ cm})^2 = 196 \text{ cm}^2$$

$$\begin{aligned} \text{Sum of the areas of the four quadrants} &= \left(4 \times \frac{1}{4} \times \frac{22}{7} \times 7 \times 7\right) \text{ cm}^2 \\ &= 154 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{Area of the shaded portion} &= \text{Area of square ABCD} - \text{Areas of the four quadrants} \\ &= (196 - 154) \text{ cm}^2 \\ &= 42 \text{ cm}^2 \end{aligned}$$

Q14

Answer :

Let ABCD be the rectangular field.

Here, AB = 60 m

BC = 40 m

Let the horse be tethered to corner A by a 14 m long rope.

Then, it can graze through a quadrant of a circle of radius 14 m.

$$\therefore \text{Required area of the field} = \left(\frac{1}{4} \times \frac{22}{7} \times 14 \times 14 \right) \text{ m}^2 = 154 \text{ m}^2$$

Hence, horse can graze 154 m² area of the rectangular field.

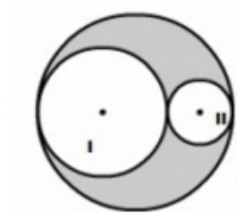
Q15

Answer :

Diameter of the big circle = 21 cm

$$\text{Radius} = \left(\frac{21}{2} \right) \text{ cm} = 10.5 \text{ cm}$$

$$\begin{aligned} \therefore \text{Area of the bigger circle} &= \pi r^2 = \left(\frac{22}{7} \times 10.5 \times 10.5 \right) \text{ cm}^2 \\ &= 346.5 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} \text{Diameter of circle I} &= \frac{2}{3} \text{ of the diameter of the bigger circle} \\ &= \frac{2}{3} \text{ of } 21 \text{ cm} = \left(\frac{2}{3} \times 21 \right) \text{ cm} = 14 \text{ cm} \end{aligned}$$

$$\text{Radius of circle I } (r_1) = \left(\frac{14}{2} \right) \text{ cm} = 7 \text{ cm}$$

$$\begin{aligned} \therefore \text{Area of circle I} &= \pi r_1^2 = \left(\frac{22}{7} \times 7 \times 7 \right) \text{ cm}^2 \\ &= 154 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Diameter of circle II} &= \frac{1}{3} \text{ of the diameter of the bigger circle} \\ &= \frac{1}{3} \text{ of } 21 \text{ cm} = \left(\frac{1}{3} \times 21 \right) \text{ cm} = 7 \text{ cm} \end{aligned}$$

$$\text{Radius of circle II } (r_2) = \left(\frac{7}{2} \right) \text{ cm} = 3.5 \text{ cm}$$

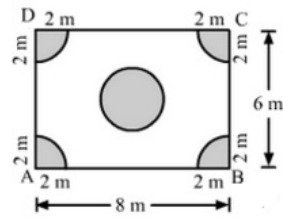
$$\begin{aligned} \therefore \text{Area of circle II} &= \pi r_2^2 = \left(\frac{22}{7} \times 3.5 \times 3.5 \right) \text{ cm}^2 \\ &= 38.5 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{Area of the shaded portion} &= \{ \text{Area of the bigger circle} - (\text{Sum of the areas of circle I and II}) \} \\ &= \{ 346.5 - (154 + 38.5) \} \text{ cm}^2 \\ &= \{ 346.5 - 192.5 \} \text{ cm}^2 \\ &= 154 \text{ cm}^2 \end{aligned}$$

Hence, the area of the shaded portion is 154 cm²

Q16

Answer :



Let ABCD be the rectangular plot of land that measures 8 m by 6 m.

\therefore Area of the plot = $(8 \text{ m} \times 6 \text{ m}) = 48 \text{ m}^2$

Area of the four flower beds = $\left(4 \times \frac{1}{4} \times \frac{22}{7} \times 2 \times 2\right) \text{ m}^2 = \left(\frac{88}{7}\right) \text{ m}^2$

Area of the circular flower bed in the middle of the plot = πr^2
 $= \left(\frac{22}{7} \times 2 \times 2\right) \text{ m}^2 = \left(\frac{88}{7}\right) \text{ m}^2$

Area of the remaining part = $\left\{48 - \left(\frac{88}{7} + \frac{88}{7}\right)\right\} \text{ m}^2$
 $= \left\{48 - \frac{176}{7}\right\} \text{ m}^2$
 $= \left\{\frac{336 - 176}{7}\right\} \text{ m}^2 = \left(\frac{160}{7}\right) \text{ m}^2 = 22.86 \text{ m}^2$

\therefore Required area of the remaining plot = 22.86 m^2

***** END *****