Exercise 20F

Length of the wire = Circumference of the circle

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

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

Perimeter of the square = 176 cm

⇒ 4*a* = 176

⇒ *a* = $\left(\frac{176}{4}\right)$cm = 44 cm

Thus, each side of the square is 44 cm.

Area of the square = (Side)^2 = (a)^2 = (44 cm)^2

= 1936 cm^2

∴ Required area of the square formed = 1936 cm^2

Q11

Answer :

Area of the acrylic sheet = 34 cm × 24 cm = 816 cm^2

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

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

∴ Area of 1 circular button = πr^2

= $\left(\frac{22}{7} \times 1.75 \times 1.75\right)$ cm^2

= 9.625 cm^2

∴ Area of 64 such buttons = (64 × 9.625) cm^2 = 616 cm^2

Area of the remaining acrylic sheet = (Area of the acrylic sheet - Area of 64 circular buttons)

= (816 - 616) cm^2 = 200 cm^2

Q12

Answer :

Area of the rectangular ground = 90 m × 32 m = (90 × 32) m^2 = 2880 m^2

Given:

Radius of the circular tank (*r*) = 14 m

∴ Area covered by the circular tank = πr^2 = $\left(\frac{22}{7} \times 14 \times 14\right)$ m^2

= 616 m^2

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

= (2880 - 616) m^2 = 2264 m^2

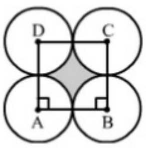
Rate of turfing = Rs 50 per sq. metre

∴ Total cost of turfing the remaining ground = Rs (50 × 2264) = Rs 1,13,200

Q13

Answer :

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



Area of the square ABCD = (Side)^2 = (14 cm)^2 = 196 cm^2

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

= 154 cm^2

∴ Area of the shaded portion = Area of square ABCD - Areas of the four quadrants

= (196 - 154) cm^2

= 42 cm^2

Q14

Answer :

Let ABCD be the rectangular field.

Here, AB = 60 m
BC = 40 m

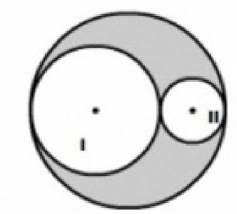
Let the horse be tethered to corner A by a 14 m long rope.

Then, it can graze through a quadrant of a circle of radius 14 m.
∴ Required area of the field = $\left(\frac{1}{4} \times \frac{22}{7} \times 14 \times 14\right)$ m^2 = 154 m^2
Hence, horse can graze 154 m^2 area of the rectangular field.

Q15

Answer :

Diameter of the big circle = 21 cm
Radius = $\left(\frac{21}{2}\right)$ cm = 10.5 cm
∴ Area of the bigger circle = πr^2 = $\left(\frac{22}{7} \times 10.5 \times 10.5\right)$ cm^2
= 346.5 cm^2



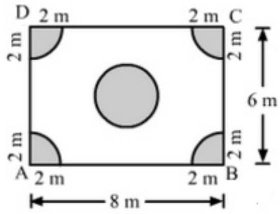
Diameter of circle I = $\frac{2}{3}$ of the diameter of the bigger circle
= $\frac{2}{3}$ of 21 cm = $\left(\frac{2}{3} \times 21\right)$ cm = 14 cm
Radius of circle I (r_1) = $\left(\frac{14}{2}\right)$ cm = 7 cm
∴ Area of circle I = $\pi {r_1}^2$ = $\left(\frac{22}{7} \times 7 \times 7\right)$ cm^2
= 154 cm^2

Diameter of circle II = $\frac{1}{3}$ of the diameter of the bigger circle
= $\frac{1}{3}$ of 21 cm = $\left(\frac{1}{3} \times 21\right)$ cm = 7 cm
Radius of circle II (r_2) = $\left(\frac{7}{2}\right)$ cm = 3.5 cm
∴ Area of circle II = $\pi {r_2}^2$ = $\left(\frac{22}{7} \times 3.5 \times 3.5\right)$ cm^2
= 38.5 cm^2

∴ Area of the shaded portion = {Area of the bigger circle - (Sum of the areas of circle I and II)}
= {346.5 - (154 + 38.5)} cm^2
= {346.5 - 192.5} cm^2
= 154 cm^2
Hence, the area of the shaded portion is 154 cm^2

Q16

Answer :



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

∴ Area of the plot = (8 m × 6 m) = 48 m^2

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

Area of the circular flower bed in the middle of the plot = πr^2

= $\left(\frac{22}{7} \times 2 \times 2\right)$ m^2 = $\left(\frac{88}{7}\right)$ m^2

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

= $\left\{48 - \frac{176}{7}\right\}$ m^2

= $\left\{\frac{336-176}{7}\right\}$ m^2 = $\left(\frac{160}{7}\right)$ m^2 = 22.86 m^2

∴ Required area of the remaining plot = 22.86 m^2

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