



Exercise 20A

Q1

Answer :

(i) Length = 24.5 m
Breadth = 18 m

$$\begin{aligned}\therefore \text{Area of the rectangle} &= \text{Length} \times \text{Breadth} \\ &= 24.5 \text{ m} \times 18 \text{ m} \\ &= 441 \text{ m}^2\end{aligned}$$

(ii) Length = 12.5 m
Breadth = 8 dm = $(8 \times 10) = 80 \text{ cm} = 0.8 \text{ m}$ [since 1 dm = 10 cm and 1 m = 100 cm]

$$\begin{aligned}\therefore \text{Area of the rectangle} &= \text{Length} \times \text{Breadth} \\ &= 12.5 \text{ m} \times 0.8 \text{ m} \\ &= 10 \text{ m}^2\end{aligned}$$

Q2

Answer :

We know that all the angles of a rectangle are 90° and the diagonal divides the rectangle into two right angled triangles.

So, 48 m will be one side of the triangle and the diagonal, which is 50 m, will be the hypotenuse.

According to the Pythagoras theorem:

$$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$$

$$\text{Perpendicular} = \sqrt{(\text{Hypotenuse})^2 - (\text{Base})^2}$$

$$\text{Perpendicular} = \sqrt{(50)^2 - (48)^2} = \sqrt{2500 - 2304} = \sqrt{196} = 14 \text{ m}$$

\therefore Other side of the rectangular plot = 14 m

Length = 48m

Breadth = 14m

$$\therefore \text{Area of the rectangular plot} = 48 \text{ m} \times 14 \text{ m} = 672 \text{ m}^2$$

Hence, the area of a rectangular plot is 672 m^2 .

Q3

Answer :

Let the length of the field be $4x \text{ m}$.

Breadth = $3x \text{ m}$

$$\therefore \text{Area of the field} = (4x \times 3x) \text{ m}^2 = 12x^2 \text{ m}^2$$

But it is given that the area is 1728 m^2 .

$$\therefore 12x^2 = 1728$$

$$\Rightarrow x^2 = \left(\frac{1728}{12} \right) = 144$$

$$\Rightarrow x = \sqrt{144} = 12$$

$$\therefore \text{Length} = (4 \times 12) \text{ m} = 48 \text{ m}$$

$$\text{Breadth} = (3 \times 12) \text{ m} = 36 \text{ m}$$

$$\therefore \text{Perimeter of the field} = 2(l + b) \text{ units}$$

$$= 2(48 + 36) \text{ m} = (2 \times 84) \text{ m} = 168 \text{ m}$$

$$\therefore \text{Cost of fencing} = \text{Rs } (168 \times 30) = \text{Rs } 5040$$

Q4

Answer :

$$\text{Area of the rectangular field} = 3584 \text{ m}^2$$

$$\text{Length of the rectangular field} = 64 \text{ m}$$

$$\text{Breadth of the rectangular field} = \left(\frac{\text{Area}}{\text{Length}} \right) = \left(\frac{3584}{64} \right) \text{ m} = 56 \text{ m}$$

$$\text{Perimeter of the rectangular field} = 2 (\text{length} + \text{breadth})$$

$$= 2(64 + 56) \text{ m} = (2 \times 120) \text{ m} = 240 \text{ m}$$

$$\text{Distance covered by the boy} = 5 \times \text{Perimeter of the rectangular field}$$

$$= 5 \times 240 = 1200 \text{ m}$$

The boy walks at the rate of 6 km/hr.

or

$$\text{Rate} = \left(\frac{6 \times 1000}{60} \right) \text{ m/min} = 100 \text{ m/min.}$$

$$\therefore \text{Required time to cover a distance of 1200 m} = \left(\frac{1200}{100} \right) \text{ min} = 12 \text{ min}$$

Hence, the boy will take 12 minutes to go five times around the field.

Q5

Answer :

Given:

Length of the verandah = 40 m = 400 dm [since 1 m = 10 dm]

Breadth of the verandah = 15 m = 150 dm

$$\therefore \text{Area of the verandah} = (400 \times 150) \text{ dm}^2 = 60000 \text{ dm}^2$$

Length of a stone = 6 dm

Breadth of a stone = 5 dm

$$\therefore \text{Area of a stone} = (6 \times 5) \text{ dm}^2 = 30 \text{ dm}^2$$

$$\therefore \text{Total number of stones needed to pave the verandah} = \frac{\text{Area of the verandah}}{\text{Area of each stone}}$$

$$= \left(\frac{60000}{30} \right) = 2000$$

Q6

Answer :

Area of the carpet = Area of the room

$$= (13 \text{ m} \times 9 \text{ m}) = 117 \text{ m}^2$$

Now, width of the carpet = 75 cm (given)

$$= 0.75 \text{ m} \quad [\text{since } 1 \text{ m} = 100 \text{ cm}]$$

$$\text{Length of the carpet} = \left(\frac{\text{Area of the carpet}}{\text{Width of the carpet}} \right) = \left(\frac{117}{0.75} \right) \text{ m} = 156 \text{ m}$$

Rate of carpeting = Rs 105 per m

$$\therefore \text{Total cost of carpeting} = \text{Rs } (156 \times 105) = \text{Rs } 16380$$

Hence, the total cost of carpeting the room is Rs 16380.

Q7

Answer :

Given:

Length of the room = 15 m

Width of the carpet = 75 cm = 0.75 m (since 1 m = 100 cm)

Let the length of the carpet required for carpeting the room be x m.

Cost of the carpet = Rs. 80 per m

$$\therefore \text{Cost of } x \text{ m carpet} = \text{Rs. } (80 \times x) = \text{Rs. } (80x)$$

Cost of carpeting the room = Rs. 19200

$$\therefore 80x = 19200 \Rightarrow x = \left(\frac{19200}{80} \right) = 240$$

Thus, the length of the carpet required for carpeting the room is 240 m.

$$\begin{aligned} \text{Area of the carpet required for carpeting the room} &= \text{Length of the carpet} \times \text{Width of the carpet} \\ &= (240 \times 0.75) \text{ m}^2 = 180 \text{ m}^2 \end{aligned}$$

Let the width of the room be b m.

$$\text{Area to be carpeted} = 15 \text{ m} \times b \text{ m} = 15b \text{ m}^2$$

$$\therefore 15b \text{ m}^2 = 180 \text{ m}^2$$

$$\Rightarrow b = \left(\frac{180}{15} \right) \text{ m} = 12 \text{ m}$$

Hence, the width of the room is 12 m.

Q8

Answer :

Total cost of fencing a rectangular piece = Rs. 9600

Rate of fencing = Rs. 24

$$\therefore \text{Perimeter of the rectangular field} = \left(\frac{\text{Total cost of fencing}}{\text{Rate of fencing}} \right) \text{ m} = \left(\frac{9600}{24} \right) \text{ m} = 400 \text{ m}$$

Let the length and breadth of the rectangular field be $5x$ and $3x$, respectively.

$$\text{Perimeter of the rectangular land} = 2(5x + 3x) = 16x$$

But the perimeter of the given field is 400 m.

$$\therefore 16x = 400$$

$$x = \left(\frac{400}{16} \right) = 25$$

$$\text{Length of the field} = (5 \times 25) \text{ m} = 125 \text{ m}$$

$$\text{Breadth of the field} = (3 \times 25) \text{ m} = 75 \text{ m}$$

Q9

Answer :

$$\begin{aligned} \text{Length of the diagonal of the room} &= \sqrt{l^2 + b^2 + h^2} \\ &= \sqrt{(10)^2 + (10)^2 + (5)^2} \text{ m} \\ &= \sqrt{100 + 100 + 25} \text{ m} \\ &= \sqrt{225} \text{ m} = 15 \text{ m} \end{aligned}$$

Hence, length of the largest pole that can be placed in the given hall is 15 m.

Q10

Answer :

Side of the square = 8.5 m

$$\begin{aligned} \therefore \text{Area of the square} &= (\text{Side})^2 \\ &= (8.5 \text{ m})^2 \\ &= 72.25 \text{ m}^2 \end{aligned}$$

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