Exercise 20A

Q11

Answer :

(i) Diagonal of the square = 72 cm

$\therefore$ Area of the square = $\left[\frac{1}{2} \times (\mathbf{Diagonal})^2\right]$ sq. unit

$= \left[\frac{1}{2} \times (72)^2\right]$ cm^2

$= 2592$ cm^2

(ii)Diagonal of the square = 2.4 m

$\therefore$ Area of the square = $\left[\frac{1}{2} \times (\mathbf{Diagonal})^2\right]$ sq. unit

$= \left[\frac{1}{2} \times (2.4)^2\right]$ m^2

$= 2.88$ m^2

Q12

Answer :

We know:

Area of a square = $\left\{\frac{1}{2} \times (\mathbf{Diagonal})^2\right\}$ sq. units

Diagonal of the square = $\sqrt{2 \times \mathbf{Area\ \ of\ \ square}}$ units

$= \left(\sqrt{2 \times 16200}\right)$m = 180 m

$\therefore$ Length of the diagonal of the square = 180 m

Q13

Answer :

Area of the square = $\left\{\frac{1}{2} \times (\mathbf{Diagonal})^2\right\}$ sq. units

Given:

Area of the square field = $\frac{1}{2}$ hectare

$= \left(\frac{1}{2} \times 10000\right)$ m^2 = 5000 m^2 [since 1 hectare = 10000 m^2]

Diagonal of the square = $\sqrt{2 \times \text{Area of } the \text{ square}}$

$= \left(\sqrt{2 \times 5000}\right)$m = 100 m

∴ Length of the diagonal of the square field = 100 m

Q14

Answer :

Area of the square plot = 6084 m^2

Side of the square plot = $\left(\sqrt{\text{Area}}\right)$

$= \left(\sqrt{6084}\right)$ m

$= \left(\sqrt{78 \times 78}\right)$m = 78 m

∴ Perimeter of the square plot = 4 × side = (4 × 78) m = 312 m

312 m wire is needed to go along the boundary of the square plot once.

Required length of the wire that can go four times along the boundary = 4 × Perimeter of the square plot

= (4 × 312) m = 1248 m

Q15

Answer :

Side of the square = 10 cm

Length of the wire = Perimeter of the square = 4 × Side = 4 × 10 cm = 40 cm

Length of the rectangle (l) = 12 cm

Let b be the breadth of the rectangle.

Perimeter of the rectangle = Perimeter of the square

$\Rightarrow 2(l + b) = 40$

$\Rightarrow 2(12 + b) = 40$

$\Rightarrow 24 + 2b = 40$

$\Rightarrow 2b = 40 - 24 = 16$

$\Rightarrow b = \left(\frac{16}{2}\right)$ cm = 8 cm

∴ Breadth of the rectangle = 8 cm

Now, Area of the square = (Side)^2 = (10 cm × 10 cm) = 100 cm^2

Area of the rectangle = $l \times b$ = (12 cm × 8 cm) = 96 cm^2

Hence, the square encloses more area.

It encloses 4 cm^2 more area.

Q16

Answer :

Given:

Length = 50 m

Breadth = 40 m

Height = 10 m

Area of the four walls = {$2h(l + b)$} sq. unit

= {2 × 10 × (50 + 40)}m^2

= {20 × 90} m^2 = 1800 m^2

Area of the ceiling = $l \times b$ = (50 m × 40 m) = 2000 m^2

∴ Total area to be white washed = (1800 + 2000) m^2 = 3800 m^2

Rate of white washing = Rs 20/sq. metre

∴ Total cost of white washing = Rs (3800 × 20) = Rs 76000

Q17

Answer :

Let the length of the room be l m.

Given:

Breadth of the room = 10 m

Height of the room = 4 m

Area of the four walls = $[2(l + b)h]$ sq units.

$= 168\ m^2$

$\therefore 168 = [2(l + 10) \times 4]$

$\Rightarrow 168 = [8l + 80]$

$\Rightarrow 168 - 80 = 8l$

$\Rightarrow 88 = 8l$

$\Rightarrow l = \left(\frac{88}{8}\right)$ m = 11 m

$\therefore$ Length of the room = 11 m

Q18

Answer :

Given:

Length of the room = 7.5 m

Breadth of the room = 3.5 m

Area of the four walls = $[2(l + b)h]$ sq. units.

$= 77\ m^2$

$\therefore 77 = [2(7.5 + 3.5)h]$

$\Rightarrow 77 = [(2 \times 11)h]$

$\Rightarrow 77 = 22h$

$\Rightarrow h = \left(\frac{77}{22}\right)$ m $= \left(\frac{7}{2}\right)$ m = 3.5 m

$\therefore$ Height of the room = 3.5 m

Q19

Answer :

Let the breadth of the room be x m.

Length of the room = $2x$ m

Area of the four walls = $\{2(l + b) \times h\}$ sq. units

$120\ m^2 = \{2(2x + x) \times 4\}\ m^2$

$\Rightarrow 120 = \{8 \times 3x\}$

$\Rightarrow 120 = 24x$

$\Rightarrow x = \left(\frac{120}{24}\right) = 5$

$\therefore$ Length of the room = $2x = (2 \times 5)$ m = 10 m

Breadth of the room = x = 5 m

$\therefore$ Area of the floor = $l \times b$ = (10 m $\times$ 5 m) = 50 m^2

Q20

Answer :

Length = 8.5 m

Breadth = 6.5 m

Height = 3.4 m

Area of the four walls = $\{2(l + b) \times h\}$ sq. units

$= \{2(8.5 + 6.5) \times 3.4\}m^2 = \{30 \times 3.4\}\ m^2 = 102\ m^2$

Area of one door = $(1.5 \times 1)\ m^2 = 1.5\ m^2$

$\therefore$ Area of two doors = $(2 \times 1.5)\ m^2 = 3\ m^2$

Area of one window = $(2 \times 1)\ m^2 = 2\ m^2$

$\therefore$ Area of two windows = $(2 \times 2)\ m^2 = 4\ m^2$

Total area of two doors and two windows = $(3 + 4)\ m^2$

$= 7\ m^2$

Area to be painted = $(102 - 7)\ m^2 = 95\ m^2$

Rate of painting = Rs 160 per m^2

Total cost of painting = Rs (95×160) = Rs 15200

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