Exercise 20D

$$= \sqrt{(3.7)^2 - (1.2)^2}$$
$$= \sqrt{13.69 - 1.44}$$
$$= \sqrt{12.25}$$
$$= 3.5$$

Area = $\left(\frac{1}{2} \times \textbf{base} \times \textbf{perpendicular}\right)$ sq. units

= $\left(\frac{1}{2} \times 1.2 \times 3.5\right)$ m^2

∴ Area of the right angled triangle = 2.1 m^2

Q8

Answer :

In a right angled triangle, if one leg is the base, then the other leg is the height.

Let the given legs be $3x$ and $4x$, respectively.

Area of the triangle = $\left(\frac{1}{2} \times 3x \times 4x\right)$ cm^2

⇒ 1014 = $(6x^2)$

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⇒ $x^2 = \left(\frac{1014}{6}\right) = 169$

⇒ $x = \sqrt{169} = 13$

∴ Base = (3 × 13) = 39 cm

Height = (4 × 13) = 52 cm

Q9

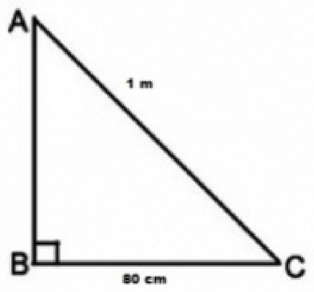
Answer :

Consider a right-angled triangular scarf (ABC).

Here, ∠B= 90°

BC = 80 cm

AC = 1 m = 100 cm



Now, $AB^2 + BC^2 = AC^2$

$\Rightarrow AB^2 = AC^2 - BC^2 = (100)^2 - (80)^2$

$= (10000 - 6400) = 3600$

$\Rightarrow AB = \sqrt{3600} = 60$ cm

Area of the scarf ABC = $\left(\frac{1}{2} \times BC \times AB\right)$ sq. units

$= \left(\frac{1}{2} \times 80 \times 60\right)$ cm^2

$= 2400$ cm^2 $= 0.24$ m^2 [since 1 m^2 = 10000 cm^2]

Rate of the cloth = Rs 250 per m^2

$\therefore$ Total cost of the scarf = Rs (250×0.24) = Rs 60

Hence, cost of the right angled scarf is Rs 60.

Q10

Answer :

(i) Side of the equilateral triangle = 18 cm

Area of the equilateral triangle = $\frac{\sqrt{3}}{4}(\mathbf{Side})^2$ sq. units

$= \frac{\sqrt{3}}{4}(18)^2$ cm^2 = $\left(\sqrt{3} \times 81\right)$ cm^2

$= (1.73 \times 81)$ cm^2 = 140.13 cm^2

(ii) Side of the equilateral triangle = 20 cm

Area of the equilateral triangle = $\frac{\sqrt{3}}{4}(\mathbf{Side})^2$ sq. units

$= \frac{\sqrt{3}}{4}(20)^2$ cm^2 = $\left(\sqrt{3} \times 100\right)$ cm^2

$= (1.73 \times 100)$ cm^2 = 173 cm^2

Q11

Answer :

It is given that the area of an equilateral triangle is $16\sqrt{3}$ cm^2.

We know:

Area of an equilateral triangle = $\frac{\sqrt{3}}{4}(\mathbf{side})^2$ sq. units

$\therefore$ Side of the equilateral triangle = $\left[\sqrt{\left(\frac{4 \times \mathbf{Area}}{\sqrt{3}}\right)}\right]$ cm

$= \left[\sqrt{\left(\frac{4 \times 16\sqrt{3}}{\sqrt{3}}\right)}\right]$ cm = $\left(\sqrt{4 \times 16}\right)$cm = $\left(\sqrt{64}\right)$cm = 8 cm

Hence, the length of the equilateral triangle is 8 cm.

Q12

Answer :

Let the height of the triangle be *h* cm.

Area of the triangle = $\left(\frac{1}{2} \times \mathbf{Base} \times \mathbf{Height}\right)$ sq. units

$= \left(\frac{1}{2} \times 24 \times h\right)$ cm^2

Let the side of the equilateral triangle be a cm.

Area of the equilateral triangle = $\left(\frac{\sqrt{3}}{4}a^2\right)$ sq. units

$= \left(\frac{\sqrt{3}}{4} \times 24 \times 24\right)$ cm^2 = $(\sqrt{3} \times 144)$ cm^2

$\therefore \left(\frac{1}{2} \times 24 \times h\right) = (\sqrt{3} \times 144)$

$\Rightarrow 12\,h = (\sqrt{3} \times 144)$

$\Rightarrow h = \left(\frac{\sqrt{3}\times 144}{12}\right) = (\sqrt{3} \times 12) = (1.73 \times 12) = 20.76$ cm

$\therefore$ Height of the equilateral triangle = 20.76 cm

Q13

Answer :

(i) Let a = 13 m, b = 14 m and c = 15 m

$s = \left(\frac{a+b+c}{2}\right) = \left(\frac{13+14+15}{2}\right) = \left(\frac{42}{2}\right)$m = 21 m

$\therefore$ Area of the triangle = $\sqrt{s(s-a)(s-b)(s-c)}$ sq. units

$= \sqrt{21(21-13)(21-14)(21-15)}$m^2

$= \sqrt{21 \times 8 \times 7 \times 6}$ m^2

$= \sqrt{3 \times 7 \times 2 \times 2 \times 2 \times 7 \times 2 \times 3}$ m^2

= (2 × 2 × 3 × 7) m^2

= 84 m^2

(ii) Let a = 52 cm, b = 56 cm and c = 60 cm

$s = \left(\frac{a+b+c}{2}\right) = \left(\frac{52+56+60}{2}\right) = \left(\frac{168}{2}\right)$ cm = 84 cm

$\therefore$ Area of the triangle = $\sqrt{s(s-a)(s-b)(s-c)}$ sq. units

$= \sqrt{84(84-52)(84-56)(84-60)}$cm^2

$= \sqrt{84 \times 32 \times 28 \times 24}$ cm^2

$= \sqrt{12 \times 7 \times 4 \times 8 \times 4 \times 7 \times 3 \times 8}$ cm^2

$= \sqrt{2 \times 2 \times 3 \times 7 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 3 \times 2 \times 2 \times 2}$ cm^2

= (2 × 2 × 2 × 2 × 2 × 2 × 3 × 3 × 7) m^2

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