Exercise 20D

$= 1344 \text{ cm}^2$

(iii) Let $a = 91$ m, $b = 98$ m and $c = 105$ m

$s = \left(\frac{a+b+c}{2}\right) = \left(\frac{91+98+105}{2}\right) = \left(\frac{294}{2}\right)$ m $= 147$ m

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

$= \sqrt{147(147-91)(147-98)(147-105)}\text{m}^2$

$= \sqrt{147 \times 56 \times 49 \times 42}\ \text{m}^2$

$= \sqrt{3 \times 49 \times 8 \times 7 \times 49 \times 6 \times 7}\ \text{m}^2$

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

$= (2 \times 2 \times 3 \times 7 \times 7 \times 7)\ \text{m}^2$

$= 4116\ \text{m}^2$

Q14

Answer :

Let $a = 33$ cm, $b = 44$ cm and $c = 55$ cm

Then, $s = \frac{a+b+c}{2} = \left(\frac{33+44+55}{2}\right)$ cm $= \left(\frac{132}{2}\right)$ cm $= 66$ cm

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

$= \sqrt{66(66-33)(66-44)(66-55)}\ \text{cm}^2$

$= \sqrt{66 \times 33 \times 22 \times 11}\ \text{cm}^2$

$= \sqrt{6 \times 11 \times 3 \times 11 \times 2 \times 11 \times 11}\ \text{cm}^2$

$= (6 \times 11 \times 11)\ \text{cm}^2 = 726\ \text{cm}^2$

Let the height on the side measuring 44 cm be h cm.

Then, Area $= \frac{1}{2} \times b \times h$

$\Rightarrow 726\ \text{cm}^2 = \frac{1}{2} \times 44 \times h$

$\Rightarrow h = \left(\frac{2 \times 726}{44}\right)$ cm $= 33$ cm.

$\therefore$ Area of the triangle $= 726\ \text{cm}^2$

Height corresponding to the side measuring 44 cm $= 33$ cm

Q15

Answer :

Let a = 13x cm, b = 14x cm and c = 15x cm

Perimeter of the triangle = 13x + 14x + 15x = 84 (given)

$\Rightarrow 42x = 84$

$\Rightarrow x = \frac{84}{42} = 2$

$\therefore a$ = 26 cm , b = 28 cm and c = 30 cm

$s = \frac{a+b+c}{2} = \left(\frac{26+28+30}{2}\right)$ cm = $\left(\frac{84}{2}\right)$ cm = 42 cm

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

$= \sqrt{42(42-26)(42-28)(42-30)}$ cm^2

$= \sqrt{42 \times 16 \times 14 \times 12}$ cm^2

$= \sqrt{6 \times 7 \times 4 \times 4 \times 2 \times 7 \times 6 \times 2}$ cm^2

= (2 ×4 × 6 × 7) cm^2 = 336 cm^2

Hence, area of the given triangle is 336 cm^2.

Q16

Answer :

Let a = 42 cm, b = 34 cm and c = 20 cm

Then, $s = \frac{a+b+c}{2} = \left(\frac{42+34+20}{2}\right)$ cm = $\left(\frac{96}{2}\right)$ cm = 48 cm

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

$= \sqrt{48(48-42)(48-34)(48-20)}$ cm^2

$= \sqrt{48 \times 6 \times 14 \times 28}$ cm^2

$= \sqrt{6 \times 2 \times 2 \times 2 \times 6 \times 14 \times 2 \times 14}$ cm^2

= (2 × 2 × 6 × 14) cm^2 = 336 cm^2

Let the height on the side measuring 42 cm be h cm.

Then, Area = $\frac{1}{2} \times b \times h$

$\Rightarrow$ 336 cm^2 = $\frac{1}{2} \times 42 \times h$

$\Rightarrow h = \left(\frac{2 \times 336}{42}\right)$ cm = 16 cm

$\therefore$ Area of the triangle = 336 cm^2

Height corresponding to the side measuring 42 cm = 16 cm

Q17

Answer :

Let each of the equal sides be a cm.

b = 48 cm

a = 30 cm

Area of the triangle = $\left\{\frac{1}{2} \times b \times \sqrt{a^2 - \frac{b^2}{4}}\right\}$ sq. units

$= \left\{\frac{1}{2} \times 48 \times \sqrt{(30)^2 - \frac{(48)^2}{4}}\right\}$ cm^2 = $\left(24 \times \sqrt{900 - \frac{2304}{4}}\right)$ cm^2

= $\left(24 \times \sqrt{900-576}\right)$ cm^2 = $\left(24 \times \sqrt{324}\right)$ cm^2 = (24 × 18) cm^2 = 432 cm^2

$\therefore$ Area of the triangle = 432 cm^2

Q18

Answer :

Let each of the equal sides be a cm.

$a + a + 12 = 32 \Rightarrow 2a = 20 \Rightarrow a = 10$

$\therefore b$ = 12 cm and a = 10 cm

Area of the triangle = $\left\{\frac{1}{2} \times b \times \sqrt{a^2 - \frac{b^2}{4}}\right\}$ sq. units

$= \left\{\frac{1}{2} \times 12 \times \sqrt{100 - \frac{144}{4}}\right\}$ cm^2 = $\left(6 - \sqrt{100 - 36}\right)$ cm^2

$= \left(6 \times \sqrt{64}\right)$ cm^2 = (6 × 8) cm^2

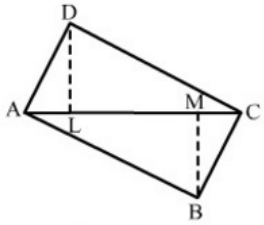
= 48 cm^2

Q19

Answer :

We have:

AC = 26 cm, *DL* = 12.8 cm and *BM* = 11.2 cm



Area of Δ*ADC* = $\frac{1}{2}$ × *AC* × *DL*

= $\frac{1}{2}$ × 26 cm × 12.8 cm = 166.4 cm^2

Area of Δ*ABC* = $\frac{1}{2}$ × *AC* × *BM*

= $\frac{1}{2}$ × 26 cm × 11.2 cm = 145.6 cm^2

∴ Area of the quadrilateral *ABCD* = Area of Δ*ADC* + Area of Δ*ABC*

= (166.4 + 145.6) cm^2

= 312 cm^2

********** END **********