Herons Formula Ex 12.1 Q3

Answer :

Whenever we are given the measurement of all sides of a triangle, we basically look for Heron's formula to find out the area of the triangle.

If we denote area of the triangle by A, then the area of a triangle having sides a, b, c and s as semi-perimeter is given by;

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

Where, $s = \frac{a+b+c}{2}$

We are given:

$a = 18$ cm

$b = 10$ cm, and perimeter $= 42$ cm

We know that perimeter $= 2s$,

So $2s = 42$

Therefore $s = 21$ cm

We know that $s = \frac{a+b+c}{2}$, so

$$21 = \frac{18+10+c}{2}$$
$$21 \times 2 = 28 + c$$
$$42 = 28 + c$$
$$c = 14\,\text{cm}$$

So the area of the triangle is:

$$A = \sqrt{21(21-18)(21-10)(21-14)}$$
$$A = \sqrt{21(3)(11)(7)}$$
$$A = \sqrt{4851}$$
$$\boxed{A = 21\sqrt{11}\ \text{cm}^2}$$

Herons Formula Ex 12.1 Q4

Answer :

Whenever we are given the measurement of all sides of a triangle, we basically look for Heron's formula to find out the area of the triangle.

If we denote area of the triangle by 'Area', then the area of a triangle having sides a, b, c and s as semi-perimeter is given by;

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

Where, $s = \frac{a+b+c}{2}$

We are given:

AB = 15 cm, BC = 13 cm, AC = 14 cm

Here we will calculate s,

$$s = \frac{\text{AB+BC+AC}}{2}$$
$$s = \frac{15+13+14}{2}$$
$$s = \frac{42}{2}$$
$$s = 21\ \text{cm}$$

So the area of the triangle is:

$$\text{Area} = \sqrt{21(21-15)(21-13)(21-14)}$$

$$\text{Area} = \sqrt{21(6)(8)(7)}$$

$$\text{Area} = \sqrt{7056}$$

$$\text{Area} = 84 \text{ cm}$$

$$\boxed{\text{Area} = 84 \text{ cm}^2}$$

Now draw the altitude from point B on AC which intersects it at point D.BD is the required altitude. So if you draw the figure, you will see,

$$\begin{aligned}\text{Area of } \Delta ABC &= \frac{1}{2} \times \text{base} \times \text{height} \\ &= \frac{1}{2} \times AC \times BD\end{aligned}$$

Here $AC = 14 \text{ cm}$ and Area of $\Delta ABC = 84 \text{ cm}^2$. So,

$$84 = \frac{1}{2} \times 14 \times BD$$

$$\begin{aligned}BD &= \frac{84 \times 2}{14} \\ &= 12 \text{ cm}\end{aligned}$$

$$\boxed{BD = 12 \text{ cm}}$$

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