Herons Formula Ex 12.1 Q5

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, $a:b:c=25:17:12$ and perimeter $=540$ m

Here,

$$s=\frac{\text{perimeter}}{2}$$
$$=\frac{540}{2}$$
$$=270 \text{ m}$$

Using these data we will find the sides of the triangle. Suppose the sides of the triangle are as follows,

$$a=25x$$
$$b=17x$$
$$c=12x$$

Since $2s=540$, so

$$2s=a+b+c$$
$$540=25x+17x+12x$$
$$540=54x$$
$$x=10$$

Now we know each side that is,

$$a=25x$$
$$=25\times10$$
$$=250 \text{ m}$$
$$b=17x$$
$$=17\times10$$
$$=170 \text{ m}$$
$$c=12x$$
$$=12\times10$$
$$=120 \text{ m}$$

Now we know all the sides. So we can use Heron's formula.

The area of the triangle is;

$$A=\sqrt{270(270-250)(270-170)(270-120)}$$
$$A=\sqrt{270(20)(100)(150)}$$
$$A=\sqrt{81000000}$$
$$\boxed{A=9000 \text{ m}^2}$$

Herons Formula Ex 12.1 Q6

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, $a:b:c = 3:5:7$ and $\text{perimeter} = 300\text{ m}$

Here,

$$\begin{aligned} s &= \frac{\text{perimeter}}{2} \\ &= \frac{300}{2} \\ &= 150\text{ m} \end{aligned}$$

Using these data we will find the sides of the triangle. Suppose the sides of the triangle are as follows,

$a = 3x$

$b = 5x$

$c = 7x$

Since $2s = 300$, so

$$\begin{aligned} 2s &= a+b+c \\ 300 &= 3x+5x+7x \\ 300 &= 15x \\ x &= 20 \end{aligned}$$

Now we know each side that is,

$$\begin{aligned} a &= 3x \\ &= 3\times 20 \\ &= 60\text{ m} \\ b &= 5x \\ &= 5\times 20 \\ &= 100\text{ m} \\ c &= 7x \\ &= 7\times 20 \\ &= 140\text{ m} \end{aligned}$$

Now we know all the sides. So we can use Heron's formula.

The area of the triangle is;

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

$$= \sqrt{150(150-60)(150-100)(150-140)}$$

$$= \sqrt{150(90)(50)(10)}$$

$$= 100\sqrt{15 \times 9 \times 5}$$

$$= 100\sqrt{5 \times 3 \times 3 \times 3 \times 5}$$

$$= 100 \times 3 \times 5\sqrt{3}$$

$$= \boxed{1500\sqrt{3}\ \mathbf{m^2}}$$

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