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

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

Here,

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

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,

$a = 25x$
$\quad = 25 \times 10$
$\quad = 250 \text{ m}$

$b = 17x$
$\quad = 17 \times 10$
$\quad = 170 \text{ m}$

$c = 12x$
$\quad = 12 \times 10$
$\quad = 120 \text{ m}$

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

We are given, $a:b:c = 3:5:7$ and perimeter = 300 m

Here,

$$s = \dfrac{\text{perimeter}}{2}$$
$$= \dfrac{300}{2}$$
$$= 150 \text{ m}$$

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

$$2s = a + b + c$$

$$300 = 3x + 5x + 7x$$

$$300 = 15x$$

$$x = 20$$

Now we know each side that is,

$$a = 3x$$
$$= 3 \times 20$$
$$= 60 \text{ m}$$

$$b = 5x$$
$$= 5 \times 20$$
$$= 100 \text{ m}$$

$$c = 7x$$
$$= 7 \times 20$$
$$= 140 \text{ m}$$

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

The area of the triangle is;

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$
$$= \sqrt{150(150-60)(150-100)(150-140)}$$
$$= \sqrt{150(90)(50)(10)}$$
$$= 100\sqrt{15 \times 9 \times 5}$$
$$= 100\sqrt{5 \times 3 \times 3 \times 3 \times 5}$$
$$= 100 \times 3 \times 5\sqrt{3}$$
$$= \boxed{1500\sqrt{3} \text{ m}^2}$$

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