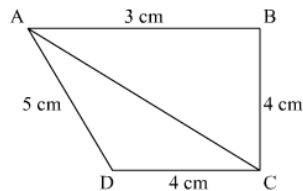




Heron's Formula Ex 12.2 Q1

Answer :

The quadrilateral ABCD having sides AB, BC, CD, DA and diagonal AC=5 cm is given, where AC divides quadrilateral ABCD into two triangles $\triangle ABC$ and $\triangle ADC$. We will find the area of the two triangles separately and then to find the area of quadrilateral ABCD.



In triangle $\triangle ABC$, observe that,

$$3^2 + 4^2 = 5^2$$

$$9 + 16 = 25$$

$$25 = 25$$

So the triangle $\triangle ABC$ is right angled triangle.

Area of right angled triangle $\triangle ABC$, is given by

$$\begin{aligned} \text{Area of } \triangle ABC &= \frac{1}{2} (\text{base} \times \text{height}) \\ &= \frac{1}{2} \times AB \times BC \\ &= \frac{1}{2} \times 3 \times 4 \\ &= 6 \text{ cm}^2 \end{aligned}$$

In $\triangle ACD$ all the sides are known, so just use Heron's formula to find out Area of triangle $\triangle ACD$,

$$\begin{aligned} s &= \frac{AD + DC + AC}{2} \\ &= \frac{5 + 4 + 5}{2} \\ &= 7 \text{ cm} \end{aligned}$$

The area of the $\triangle ACD$ is:

$$\begin{aligned} \text{Area of } \triangle ACD &= \sqrt{s(s-AD)(s-DC)(s-CB)} \\ &= \sqrt{7(7-5)(7-5)(7-4)} \\ &= \sqrt{7(2)(2)(3)} \\ &= \sqrt{84} \\ &= 9.16 \text{ cm}^2 \end{aligned}$$

Area of quadrilateral ABCD will be,

Area = Area of triangle ABC + Area of triangle ADC

$$\text{Area} = 6 + 9.16$$

$$= 15.16 \text{ cm}^2$$

$$\boxed{\text{Area} = 15.16 \text{ cm}^2}$$

Heron's Formula Ex 12.2 Q2

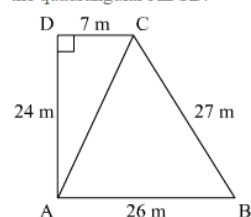
Answer :

We assume quadrilateral ABCD be the quadrangular field having sides AB, BC, CD, DA and

$$\angle CDA = 90^\circ.$$

We take a diagonal AC, where AC divides quadrilateral ABCD into two triangles $\triangle ABC$ and $\triangle ADC$

We will find the area of two triangles $\triangle ABC$ and $\triangle ADC$ separately and add them to find the area of the quadrangular ABCD.



In triangle $\triangle ADC$, we have

$$AD = 24 \text{ m}; DC = 7 \text{ m}$$

We use Pythagoras theorem to find side AC,

$$AC^2 = AD^2 + DC^2$$

$$AC^2 = (24)^2 + (7)^2$$

$$AC^2 = 576 + 49$$

$$AC = \sqrt{625}$$

$$AC = 25 \text{ m}$$

Area of right angled triangle $\triangle ADC$, say A_1 is given by

$$A_1 = \frac{1}{2}(\text{Base} \times \text{Height})$$

Where, Base = DA = 24 m; Height = DC = 7 m

$$A_1 = \frac{1}{2}(24 \times 7)$$

$$A_1 = 84 \text{ m}^2$$

Area of triangle $\triangle ABC$, say A_2 having sides a , b , c and s as semi-perimeter is given by

$$A_2 = \sqrt{s(s-a)(s-b)(s-c)}$$

Where, $a = AC = 25 \text{ m}$; $b = AB = 26 \text{ m}$; $c = BC = 27 \text{ m}$

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

$$s = \frac{25+26+27}{2}$$

$$s = 39 \text{ m}$$

$$A_2 = \sqrt{39(39-25)(39-26)(39-27)}$$

$$A_2 = \sqrt{39(14)(13)(12)}$$

$$A_2 = \sqrt{85176}$$

$$A_2 = 291.84 \text{ m}^2$$

Area of quadrilateral ABCD, say A

$A = \text{Area of triangle } \triangle ADC + \text{Area of triangle } \triangle ABC$

$$A = A_1 + A_2$$

$$A = 84 + 291.84$$

$$A = \boxed{375.8 \text{ m}^2}$$

***** END *****