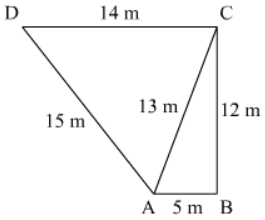
Herons Formula Ex 12.2 Q3

Answer :

We assume ABCD be the quadrilateral having sides AB, BC, CD, DA and angle $\angle ABC = 90^{\circ}$.
We take a diagonal AC, where AC divides quadrilateral ABCD into two triangles ΔABC and ΔADC.
We will find the area of these two triangles and add them to find the area of the quadrilateral ABCD



In triangle ΔABC, we have
AB = 5 m; BC = 12 m
We will use Pythagoras theorem to calculate AC

$AC^2 = AB^2 + BC^2$

$AC^2 = (5)^2 + (12)^2$

$AC^2 = 25 + 144$

$AC = \sqrt{169}$

$AC = 13 \text{ m}$

Area of right angled triangle ΔABC, say A_1 is given by

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

Where, Base = AB = 5 m; Height = BC = 12 m

$$A_1 = \frac{1}{2}(5 \times 12)$$

$$A_1 = 30 \text{ m}^2$$

Area of triangle ΔADC, 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 = 13 m; b = DC = 14 m; c = AD = 15 m

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

$$s = \frac{13+14+15}{2}$$

$$s = 21$$

$$A_2 = \sqrt{21(21-13)(21-14)(21-15)}$$

$$A_2 = \sqrt{21(8)(7)(6)}$$

$$A_2 = \sqrt{7056}$$

$$A_2 = 84 \text{ m}^2$$

Area of quadrilateral ABCD, say A

A = Area of triangle ΔABC + Area of triangle ΔADC

$$A = A_1 + A_2$$

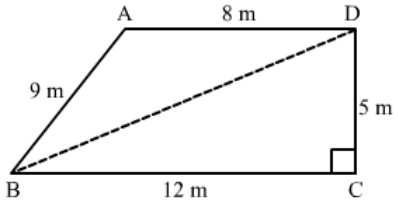
$$A = 30 + 84$$

$$\boxed{A = 114 \text{ m}^2}$$

Herons Formula Ex 12.2 Q4

Answer :

We assume ABCD be the quadrilateral having sides AB, BC, CD, DA and $\angle DCB = 90^o$
We take a diagonal DB, where DB divides ABCD into two triangles ΔBCD and ΔABD



In ΔBCD, we have
DC = 5 m; BC = 12 m
Use Pythagoras theorem

$BD^2 = DC^2 + BC^2$

$BD^2 = (5)^2 + (12)^2$

$BD^2 = 25 + 144$

$BD = \sqrt{169}$

$BD = 13 \text{ m}$

Area of right angled triangle ΔBCD, say A_1 is given by

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

Where, Base = DC = 5 m; Height = BC = 12 m

$$A_1 = \frac{1}{2}(5 \times 12)$$

$$A_1 = 30 \text{ m}^2$$

Area of triangle ΔABD, 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 = AD = 8 m; b = AB = 9 m; c = BD = 13 m

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

$$s = \frac{8+9+13}{2}$$

$$s = 15 \text{ m}$$

$$A_2 = \sqrt{15(15-8)(15-9)(15-13)}$$

$$A_2 = \sqrt{15(7)(6)(2)}$$

$$A_2 = \sqrt{1260}$$

$$A_2 = 35.49 \text{ m}^2$$

Area of quadrilateral □ABCD, say A

A = Area of triangle DCB + Area of triangle ABD

$A = A_1 + A_2$

$A = 30 + 35.49$

$A = \boxed{65.49 \text{ m}^2}$

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