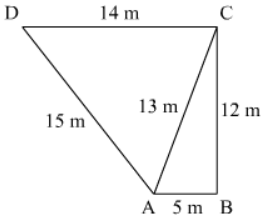
Herons Formula Ex 12.2 Q3

**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 $\Delta ABC$ and $\Delta ADC$.
We will find the area of these two triangles and add them to find the area of the quadrilateral ABCD




In triangle $\Delta ABC$, 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 $\Delta ABC$, 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 $\Delta ADC$, 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 $\Delta ABC$ + Area of triangle $\Delta ADC$

$$A = A_1 + A_2$$

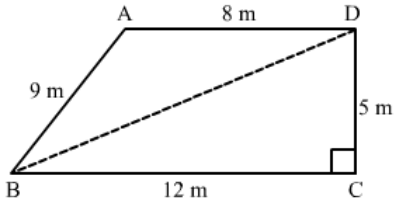
$$A = 30 + 84$$

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

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 **********