

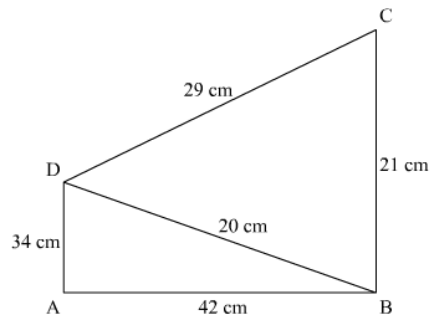


Heron's Formula Ex 12.2 Q9

Answer :

The quadrilateral ABCD having sides AB, BC, CD, DA and diagonal BD is given, where BD divides ABCD into two triangles

$\triangle DBC$ and $\triangle DAB$



In triangle DBC, we can observe that

$$DC^2 = DB^2 + BC^2$$

Therefore, it is a right angled triangle.

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

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

Where,

Base = BC = 21 cm; Height = BD = 20 cm

$$A_1 = \frac{1}{2} (21 \times 20)$$

$$A_1 = 210 \text{ cm}^2$$

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

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

$a = DB = 20 \text{ cm}$; $b = AD = 34 \text{ cm}$; $c = AB = 42 \text{ cm}$

$$s = \frac{20 + 34 + 42}{2}$$

$$s = \frac{96}{2}$$

$$s = 48$$

$$A_2 = \sqrt{48(48-20)(48-34)(48-42)}$$

$$A_2 = \sqrt{48(28)(14)(6)}$$

$$A_2 = \sqrt{112896}$$

$$A_2 = 336 \text{ cm}^2$$

Area of quadrilateral ABCD, say A

$A = \text{Area of triangle DBC} + \text{Area of triangle DAB}$

$$A = A_1 + A_2$$

$$A = 210 + 336$$

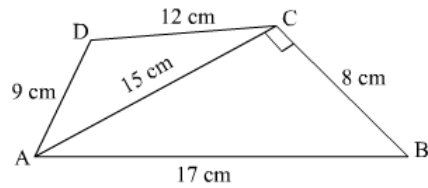
$$\boxed{A = 546 \text{ cm}^2}$$

Heron's Formula Ex 12.2 Q10

Answer :

We assume ABCD be the quadrilateral having sides AB, BC, CD, DA and $\angle ACB = 90^\circ$.

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



Since $\triangle ACB$ is right angled at C, we have

$AC = 15$ cm; $AB = 17$ cm

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

$$(17)^2 = (15)^2 + BC^2$$

$$289 = 225 + BC^2$$

$$BC^2 = 289 - 225$$

$$BC^2 = \sqrt{64}$$

$$BC = 8 \text{ cm}$$

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

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

Base = BC = 8 cm; Height = AC = 15 cm

$$A_1 = \frac{1}{2}(8 \times 15)$$

$$A_1 = 60 \text{ cm}^2$$

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

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

$a = AD = 9$ cm; $b = DC = 12$ cm; $c = AC = 15$ cm

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

$$s = \frac{9+12+15}{2}$$

$$s = 18$$

$$A_2 = \sqrt{18(18-9)(18-12)(18-15)}$$

$$A_2 = \sqrt{18(9)(6)(3)}$$

$$A_2 = \sqrt{2916}$$

$$A_2 = 54 \text{ cm}^2$$

Area of quadrilateral ABCD, say A

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

$$A = A_1 + A_2$$

$$= 60 + 54$$

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

Perimeter of quadrilateral ABCD, say P

$$P = 9 + 12 + 8 + 17$$

$$= 46 \text{ cm}$$

$$\boxed{P = 46 \text{ cm}}$$

***** END *****