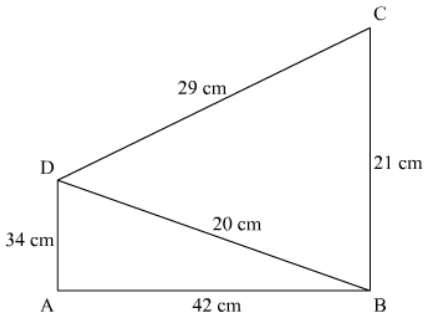
Herons Formula Ex 12.2 Q9

Answer :

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

ΔDBC and ΔDAB



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

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

a = DB = 20 cm; b = AD = 34 cm; c = AB = 42 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 = Area of triangle DBC + Area of triangle DAB

$$A = A_1 + A_2$$

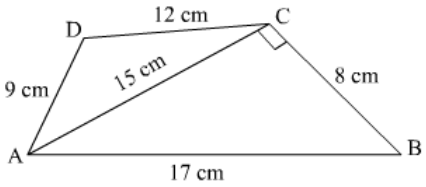
$$A = 210 + 336$$

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

Herons Formula Ex 12.2 Q10

Answer :

We assume ABCD be the quadrilateral having sides AB, BC, CD, DA and ∠ACB = 90°.
We take a diagonal AC, where AC divides ABCD into two triangles ΔACB and ΔADC



Since ΔACB is right angled at C, we have
AC = 15 cm; AB = 17 cm

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

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

$289 = 225 + BC^2$

$BC^2 = 289 - 225$

$BC^2 = \sqrt{64}$

$BC = 8$ cm

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

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

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

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

$A = A_1 + A_2$

$= 60 + 54$

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

Perimeter of quadrilateral ABCD, say P

$P = 9 + 12 + 8 + 17$

$= 46 \text{ cm}$

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

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