

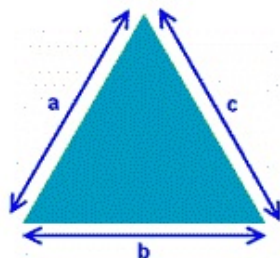
FlexiPrep: Downloaded from flexiprep.com [https://www.flexiprep.com/]

For solved question bank visit [doorsteptutor.com](https://www.doorsteptutor.com) [https://www.doorsteptutor.com] and for free video lectures visit [Examrace YouTube Channel](https://youtube.com/c/Examrace/) [https://youtube.com/c/Examrace/]

NCERT Class 9 Solutions: Heron's Formula (Chapter 12) Exercise 12.2 Part 1

Get unlimited access to the best preparation resource for CBSE/Class-9 : [get questions, notes, tests, video lectures and more](https://www.doorsteptutor.com/Exams/CBSE/Class-9/) [https://www.doorsteptutor.com/Exams/CBSE/Class-9/] - for all subjects of CBSE/Class-9.

Heron's Triangle & Formulas



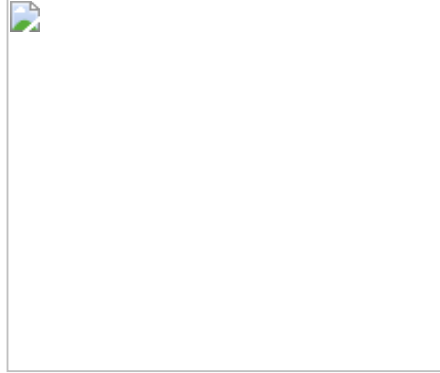
$$\text{semiperimeter } s = \frac{(a + b + c)}{2}$$

$$\text{area } A = \sqrt{s(s - a)(s - b)(s - c)}$$

Q-1 A park, in the shape of a quadrilateral ABCD, has

$\angle B = 90^\circ$, $CA = 9m$, $AB = 12m$, $BD = 5m$ and $CD = 8m$. How much area does it occupy?

Solution:



Given a quadrilateral ABCD with, $\angle B = 90^\circ$, $CA = 9m$, $AB = 12m$, $BD = 5m$ and $CD = 8m$.

Construction: Join diagonal AD

To find the area of quadrilateral we can add the areas of two triangles. In $\triangle ABD$, by applying Pythagoras theorem,

- $AD^2 = AB^2 + BD^2$
- $AD^2 = 12^2 + 5^2$
- $AD^2 = 169$
- $AD = 13m$

Also since triangle $\triangle ABD$ is right triangle, Area of $\triangle ABD = \frac{1}{2} \times 12 \times 5 = 30m^2$ Now, semi perimeter of $\triangle CAD$ $\frac{8+9+13}{2}m = \frac{30}{2}m = 15m$

Using heron's formula, area of $\triangle CAD$

- $\sqrt{s(s-a)(s-b)(s-c)}$
- $\sqrt{15(15-13)(15-9)(15-8)}m^2$
- $\sqrt{15 \times 2 \times 6 \times 7}m^2$
- $6\sqrt{35}m^2$
- $35.49m^2$ (approx.)

Area of quadrilateral $ABCD = \text{Area of } \triangle ABD + \text{Area of } \triangle CAD = 30m^2 + 35.49m^2 = 65.49m^2$

Q-2 Find the area of a quadrilateral ABCD in which

$CD = 3\text{ cm}$, $CB = 4\text{ cm}$, $AD = 4\text{ cm}$, $AD = 5\text{ cm}$ and $BD = 5\text{ cm}$.

Solution:



Given a quadrilateral ABCD, $CD = 3\text{ cm}$, $CB = 4\text{ cm}$, $AD = 4\text{ cm}$, $AD = 5\text{ cm}$ and $BD = 5\text{ cm}$.

We can calculate the area of the two triangles by using heron's formula on the two triangles.

However we can make things simple by first proving that $\triangle DCB$ is a right triangle. let's see if it satisfies Pythagoras theorem,

- $BD^2 = DC^2 + CB^2$
- $5^2 = 3^2 + 4^2$
- $25 = 9 + 16$
- $25 = 25$

Thus, $\triangle DCB$ is a right angled at C. Area of $\triangle CBA$

- $\frac{1}{2} \times 3 \times 4 = 6\text{ cm}^2$

Now, semi perimeter of $\triangle DBA = \frac{5 + 5 + 4}{2}\text{ cm} = \frac{14}{2}\text{ cm} = 7\text{ m}$

Using heron's formula, area of $\triangle DCA$

- $= \sqrt{s(s-a)(s-b)(s-c)}$
- $= \sqrt{7(7-5)(7-5)(7-4)}\text{ cm}^2$
- $= \sqrt{7 \times 2 \times 2 \times 3}\text{ cm}^2$
- $= 2\sqrt{21}\text{ cm}^2$

- $\approx 9.17\text{cm}^2$ (approx.)

Finally, area of quadrilateral

- $ABCD = \text{Area of } \triangle DCB + \text{Area of } \triangle DCA = 6\text{cm}^2 + 9.17\text{cm}^2 = 15.17\text{cm}^2$