Heron's Formula.

Area of Right angle Δ = $\frac{1}{2} \times b \times h$

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

Perimeter = $a+b+c$

Semi perimeter = $\frac{a+b+c}{2}$

1. A traffic signal board, indicating 'SCHOOL AHEAD', is an equilateral triangle with side 'a'. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board? ..

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

$s = \frac{a+a+a}{2} = \frac{3a}{2}$

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

$A = \sqrt{s(s-a)(s-a)(s-a)}$

$A = \sqrt{\frac{3a}{2}\left(\frac{3a}{2}-a\right)\left(\frac{3a}{2}-a\right)\left(\frac{3a}{2}-a\right)}$

$A = \sqrt{\frac{3a}{2}\left(\frac{a}{2}\right)\left(\frac{a}{2}\right)\left(\frac{a}{2}\right)}$

$A = \sqrt{3 \times \left(\frac{a}{2}\right)^2 \times \left(\frac{a}{2}\right)^2}$

$A = \sqrt{3}\,\frac{a}{2} \times \frac{a}{2}$

$A = \frac{\sqrt{3}\,a^2}{4}$

$P = 180\ cm$

$a+b+c = 180\ cm$

$a+a+a = 180$

$3a = 180$

$a = 60\ cm$

$A = \frac{\sqrt{3}}{4} \times (60)^2$

$= \frac{\sqrt{3}}{4} \times 60 \times 60$

$= 900\sqrt{3}\ cm^2$

Why?

2. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m (see Fig. 12.9). The advertisements yield an earning of ₹ 5000 per m^2 per year. A company hired one of its walls for 3 months. How much rent did it pay?

Fig. 12.9

5000 m^2

Area of Δ = ___ m^2

1320 m^2

$1\ m^2$ cost = Rs 5000

$1320\ m^2$ = Rs (1320 × 5000)

12 months = (1320 × 5000)

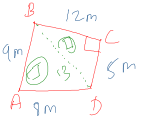
3 months = $\frac{1320 \times 5000 \times 3}{12}$

= ___

Rs

EXERCISE 12.2

1. A park, in the shape of a quadrilateral ABCD, has ∠C = 90°. AB = 9 m, BC = 12 m, CD = 5 m and AD = 8 m. How much area does it occupy?



Draw - BD

Δs BCD by P.G.T

BD = 13m

Δ BCD

$= \frac{1}{2} \times 5 \times 12$

$= 30\ m^2$

$s = \frac{\quad}{\quad} =$

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