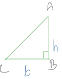
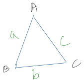
Heron's Formula.



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



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

Perimeter $= a+b+c$

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

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?

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

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

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

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

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

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

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

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

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

$p = 180$ 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 m² per year. A company hired one of its walls for 3 months. How much rent did it pay?

Fig. 12.9

5000 m²

Area of Δ = ___ m²

1320 m²

1 m² cost = Rs 5000

1320 m² = Rs (1320 × 5000)

12 months (1320 × 5000)

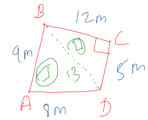
3 months

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

= Rs

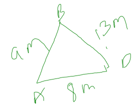
EXERCISE 12.2

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?



Knowing

Draw BD in Δ BCD by P.G.T



BD = 13 m

$\Delta BCD = \frac{1}{2} \times 5 \times 12 = 30\ m^2$

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

$6\sqrt{35}$

$\sqrt{35}$

$30 + 6\sqrt{35}$

$\sqrt{n} = \sqrt{11} = 3\ \&\ 4$

$\sqrt{9} = 3$

$\sqrt{16} = 4$

i) 3) 11 (3
−9
2

1×1 = 1
2×2 = 4
3×3 = 9
4×4 = 16

ii)

i) $\sqrt{11}$ =

3 | 11
− 9
2

Quotient: 3

$1 \times 1 = 1$
$2 \times 2 = 4$
$3 \times 3 = 9$
$4 \times 4 = 16$

(ii) 3 | 11
− 9
2

Quotient: 3

×2 → 6

Multiply the quotient by 2

(iii) 3 | 11 $\overline{00}$ $\overline{00}$ $\overline{00}$ . . .
− 9
6 | 2

Quotient: 3.

Putting point & adding pair of zeros

iv) 3 | 11 $\overline{00}$ . . .
−9 ↓
63 | 200
189
11

Quotient: 3.3

$61 \times 1 = 61$

$62 \times 2 = 124$

$63 \times 3 = 189$

$64 \times 4 = 256$

v) 3 | 11 $\overline{00}$ 00 . . .
− 9
63 | 200
− 189
661 | 1100
− 661
439

Quotient: 3.31

×2

Ignore the point in divisor

$662 \times 2 = 1324$

5 | 35 00 00 000 . .
25
109 | 1000
981
1181 | 1900
1181

Quotient: 5.91

×2

101 > 10

$109 \times 9 = 981$

1182×2

∴ ≃ 65.4 m^2