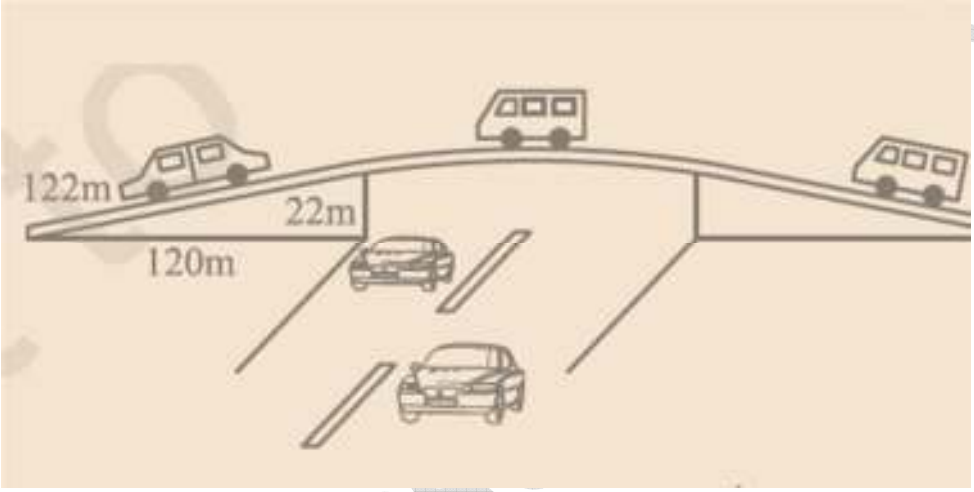
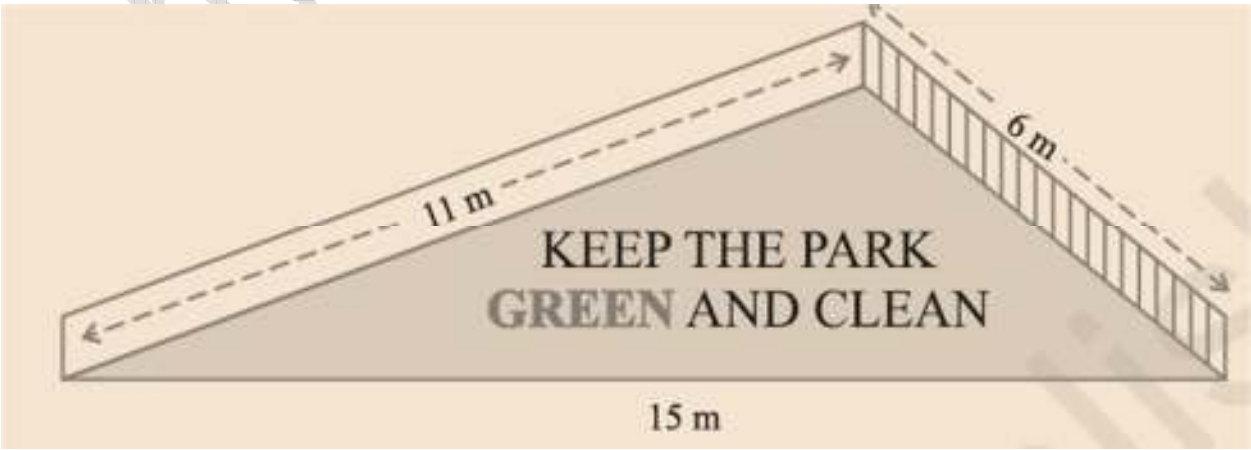
Heron Formula Exercise 1

Question 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?

Question 2:
The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122m, 22m, and 120m (see the given figure). The advertisements yield an earning of Rs 5000 per m2 per year. A company hired one of its walls for 3 months. How much rent did it pay?



Question 2
There is a slide in a park. One of its side walls has been painted in some color with a message "KEEP THE PARK GREEN AND CLEAN" . If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in color.



Question 4:
Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

Question 5:
Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.

Question 6:
An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle

Solution 1:
Semi-perimeter of triangle =s= (a+a+a)/2 =3a/2

Using Heron's formula,

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

Where s is the semi-perimeter of triangle .
And, a, b and c are lengths of sides of triangle.

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

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

If perimeter of equilateral triangle is equal to 180 cm then we can easily find length of each side.

Let length of each side =a cm.

According to the given condition, we have

a+a+a=180
3a=180
a=60 cm
Putting this value in Area formula we derived above, we get
Area of triangle =900√3 cm^2

Solution 2:
Sides of triangle a, b, c are of 122 m, 22 m, and 120 m respectively
s = (122 + 22 + 120)/2 m
s = 132 m

By Heron's formula

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

A=1320 m^2

Rent of 1 m^2 area per year = Rs.5000

Rent of 1 m^2 area per month = Rs 5000/12

Rent of 1320 m^2 area for 3 months = Rs. (5000/12)X1320

= Rs.1650000

So, company had to pay Rs.1650000.

Solution 3:

It can be observed that the area to be painted in color is a triangle, having its sides as 11 m, 6 m, and 15 m.

s = (11 + 6 + 15)/2 m

s = 16 m

By Heron's formula,

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

A=20√2 m^2

Therefore, the area painted in color is 20√2 m^2

Solution 4:

a=18 cm

b=10 cm

Perimeter of triangle (a+b+c) =42 cm

c =42−18−10=14 cm

s = (18+10+14)/2=21cm

Using Heron's formula to find area of triangle, we get

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

A=20√11 cm^2

Solution 5:

Let the common ratio between the sides of given triangle be x.

So, side of triangle will be 12x, 17x, and 25x.

Perimeter of this triangle = 540 cm

12x + 17x + 25x = 540 cm

54x = 540 cm

x = 10 cm

Sides of triangle will be 120 cm, 170 cm, and 250 cm.

s=(a+b+c)/2=270 cm

By Heron's formula

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

A=9000 cm^2

Solution 6:

Let the third side of this triangle be x.

Perimeter of triangle = 30 cm

12 cm + 12 cm + x = 30 cm

x = 6 cm

s= 30/2=15 cm

By Heron's formula,

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