Field Base and Height

The base of a triangular field is three times its altitude. If the cost of sowing the field at Rs.58 per hectare is Rs.783, find its base and height.

Step 1: Relation between base and height

Let the altitude (height) of the triangular field be h meters, and its base be $3h$ meters.

Step 2: Formula for the area of a triangle

The area of the triangle is given by:

$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$$

Substitute the base and height:

$$\text{Area} = \frac{1}{2} \times 3h \times h = \frac{3h^2}{2} \, \text{square meters}.$$

Step 3: Convert cost to area

The total cost is 783 Rs, and the cost of sowing is 58 Rs per hectare.
1 hectare = $10,000$ square meters.

The total area of the field is:

$$\text{Area} = \frac{\text{Total cost}}{\text{Cost per hectare}} \times 10,000$$

$$\text{Area} = \frac{783}{58} \times 10,000 = 13,500 \, \text{square meters}.$$

Step 4: Equating the areas

The area from the geometry is $\frac{3h^2}{2}$, and the calculated area is $13,500$:

$$\frac{3h^2}{2} = 13,500$$

$$3h^2 = 27,000$$

$$h^2 = 9,000$$

$\Rightarrow h = 300$ m [taking square root both sides]

Thus, we have

Height = $h = 300$ m

Base = $3h = 900$ m.