

Mathematics

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(Chapter – 12) (Heron's Formula)(Exemplar Problems)

(Class – IX)

Exercise 12.4

Question 5:

A field is in the shape of a trapezium having parallel sides 90 m and 30 m. These sides meet the third side at right angles. The length of the fourth side is 100 m. If it costs Rs 4 to plough 1m^2 of the field, find the total cost of ploughing the field.

Answer 5:

In trapezium ABCD, we draw a perpendicular line CE to the line AB.

We have, $DE = AE = 30\text{m}$

Now, $BE = AB - AE = 90 - 30 = 60\text{m}$

In right angled $\triangle BEC$ $BC^2 = BE^2 + EC^2$ [Using Pythagoras theorem]

$$\Rightarrow 100^2 = 60^2 + EC^2$$

$$\Rightarrow EC^2 = 10000 - 3600$$

$$\Rightarrow EC^2 = 6400$$

$$\therefore EC = \sqrt{6400} = 80\text{m}$$

[Taking positive square root because length is always positive]

Area of trapezium

$$= \frac{1}{2} (\text{Sum of parallel Sides}) \times \text{distance between parallel sides}$$

$$= \frac{1}{2} (AB + CD) \times EC = \frac{1}{2} (90 + 30) \times 80$$

$$= \frac{1}{2} \times (120) \times 80 = 4800\text{m}^2$$

\therefore Cost of ploughing the field of $1\text{m}^2 = \text{Rs } 4$

\therefore Cost of ploughing the field of $4800\text{m}^2 = 4800 \times 4 = \text{Rs } 19200$

Hence, the total cost of ploughing the field is Rs.19200

