

Mathematics

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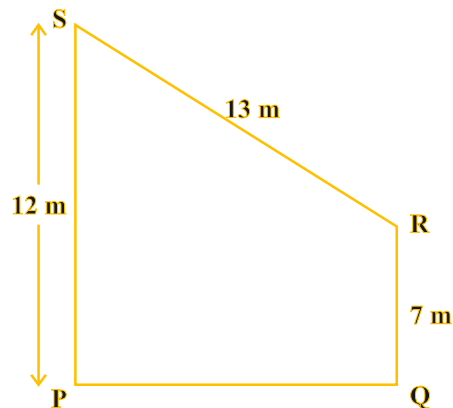
(Chapter – 12) (Heron's Formula)(Exemplar Problems)

(Class – IX)

Exercise 12.3

Question 10:

Find the area of the trapezium PQRS with height PQ given in Fig. 12.3



Answer 10:

We have, trapezium PQRS, in which draw a line RT perpendicular to PS.

Where, Side,

$$ST = PS - TP = 12 - 7 = 5 \text{ m.}$$

In right angled ΔSTR ,

$$(SR)^2 = (ST)^2 + (TR)^2 \quad \text{[by using Pythagoras theorem]}$$

$$(13)^2 = (5)^2 + (TR)^2$$

$$(TR)^2 = 169 - 25$$

$$(TR)^2 = 144$$

$$TR = 12 \text{ m}$$

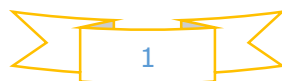
[Taking positive square root because length is always positive]

$$\text{Now, area of } \Delta STR = \frac{1}{2} \times TR \times TS \quad [\because \text{area of triangle} = \frac{1}{2} (\text{base} \times \text{height})]$$

$$= \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2$$

$$\text{Now, area of rectangle PQRT} = PQ \times RQ = 12 \times 7$$

$$[\because \text{Area of rectangle} = \text{length} \times \text{breadth}]$$



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$$= 84m^2 \quad [\because PQ = TR = 12m]$$

\therefore Area of trapezium

= Area of DSTR + Area of rectangle PQRT

$$= 30 + 84$$

$$= 114m^2$$

Hence, the area of trapezium is $114m^2$

Alternate Method

Find TR as in above method

\therefore Area of trapezium

$$= \frac{1}{2} (\text{Sum of Parallel lines}) \times \text{Distance between two points}$$

$$= \frac{1}{2} (PS + QR) \times TR = \frac{1}{2} \times (12 + 7) \times 12 \quad [\text{From Equation (i)}]$$

$$= \frac{1}{2} \times 19 \times 12 = 114m^2$$

Hence, the area of trapezium is $114m^2$.

