

# Mathematics

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

(Class – IX)

## Exercise 12.3

### Question 9:

A rhombus shaped sheet with perimeter 40 cm and one diagonal 12 cm, is painted on both sides at the rate of Rs 5 per m<sup>2</sup>. Find the cost of painting.

### Answer 9:

Let ABCD be a rhombus having each side equal to x cm

i.e.,  $AB = BC = CD = DA = x$  cm

Given, perimeter of rhombus = 40

$$\therefore AB + BC + CD + DA = 40$$

$$\Rightarrow x + x + x + x = 40$$

$$\Rightarrow 4x = 40$$

$$\Rightarrow x = \frac{40}{4}$$

$$\therefore x = 10 \text{ cm}$$

In  $\Delta ABC$ ,

Let  $a = AB = 10$  cm,  $b = BC = 10$  cm and  $c = AC = 12$ cm

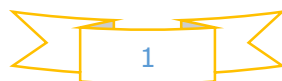
Now, Semi – Perimeter  $\Delta ABC$ ,

$$s = \frac{a + b + c}{2} = \frac{10 + 10 + 12}{2} = \frac{32}{2} = 16 \text{ cm}$$

$$\therefore \text{Area of } \Delta ABC = \sqrt{s(s-a)(s-b)(s-c)} \quad [\text{By Heron's formula}]$$

$$= \sqrt{16(16-10)(16-10)(16-12)}$$

$$= \sqrt{16 \times 6 \times 6 \times 4} = 4 \times 6 \times 2 = 48 \text{ cm}^2$$



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∴ Area of the rhombus

$$= 2 (\text{Area of } \triangle ABC)$$

$$= 2 \times 48$$

$$= 96 \text{ cm}^2$$

∴ Cost of painting of the sheet of  $1 \text{ cm}^2 = \text{Rs } 5$

∴ Cost of painting of the sheet of  $96 \text{ cm}^2 = 96 \times 5 = \text{Rs } 480$

Hence, the cost of the painting of the sheet for both sides =  $2 \times 480 = \text{Rs. } 480$ .

