

# Mathematics

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

(Class – IX)

## Exercise 12.3

### Question 6:

A field in the form of a parallelogram has sides 60m and 40 m and one of its diagonals is 80 m long. Find the area of the parallelogram.

### Answer 6:

Let ABCD be a parallelogram field with sides  $AB = CD = 60\text{m}$ ,  $BC = DA = 40\text{m}$  and diagonal  $BD = 80\text{m}$

Area of parallelogram ABCD = 2 (Area of  $\Delta ABD$ ) .....(i)

In  $\Delta ABD$ ,

$\therefore$  Semi- Perimeter of a triangle  $\Delta ABD$ ,

$$s = \frac{a+b+c}{2} = \frac{AB+BD+DA}{2} = \frac{60+80+40}{2} = \frac{180}{2} = 90\text{m}$$

$\therefore$  Area of  $\Delta ABD = \sqrt{s(s-a)(s-b)(s-c)}$  [by Heron's formula]

$$= \sqrt{90(90-60)(90-80)(90-40)}$$

$$= \sqrt{90 \times 30 \times 10 \times 50}$$

$$= 100 \times 3\sqrt{15} = 300\sqrt{15}\text{m}^2$$

From Equation (i), we get

$$\text{Area of parallelogram ABCD} = 2 \times 300\sqrt{15} = 600\sqrt{15}\text{m}^2$$

Hence, the area of parallelogram is  $600\sqrt{15}\text{m}^2$

