

Mathematics

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

(Class – IX)

Exercise 12.3

Question 7:

The perimeter of a triangular field is 420 m and its sides are in the ratio 6:7:8. Find the area of the triangular field.

Answer 7:

Given, perimeter of a triangular field is 420m and its sides are in the ratio 6:7:8.

Let sides of a triangular field be $a = 6x$, $b = 7x$ and $c = 8x$.

∴ Perimeter of a triangular field, $2s = a + b + c$

$$\Rightarrow 420 = 6x + 7x + 8x \Rightarrow 420 = 21x$$

$$\Rightarrow x = \frac{420}{21} = 20m$$

∴ Sides of a triangular field are $a = 6 \times 20 = 120m$

$$b = 7 \times 20 = 140m$$

and $c = 8 \times 20 = 160m$

$$\text{Now, Semi- Perimeter, } s = \frac{a+b+c}{2} = \frac{120+140+160}{2} = \frac{420}{2} = 210m$$

∴ Area of triangular field = $\sqrt{s(s-a)(s-b)(s-c)}$ [by Heron's formula]

$$= \sqrt{210(210-120)(210-140)(210-160)}$$

$$= \sqrt{210 \times 90 \times 70 \times 50}$$

$$= 100 \sqrt{21 \times 9 \times 7 \times 5}$$

$$= 100 \times 7 \times 3 \times \sqrt{15} = 2100\sqrt{15}m^2$$

Hence, the area of a triangular field is $2100\sqrt{15} m^2$.

