

### EXAMPLE 2:

A triangular park ABC has sides 120m, 80m and 50m. A gardener Dhanca has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of Rs 20 per metre leaving a space 3m wide for a gate on one side.

Ans

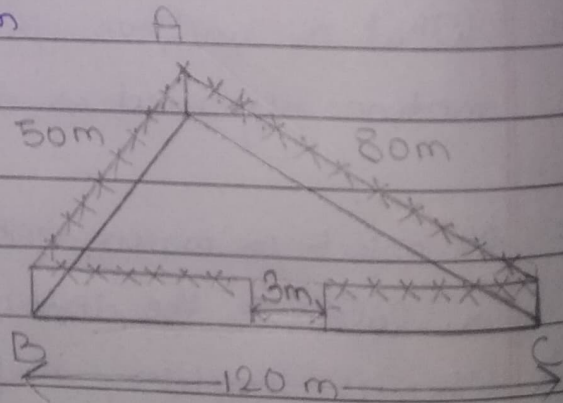
$$2s = 50m + 80m + 120m = 250m$$

$$s = \frac{250}{2} = 125m$$

$$s - a = (125 - 120)m = 5m$$

$$s - b = (125 - 80)m = 45m$$

$$s - c = (125 - 50)m = 75m$$



$$\begin{aligned} \text{Area of the park} &= \sqrt{s(s-a)(s-b)(s-c)} \\ &= \sqrt{125 \times 5 \times 45 \times 75} \text{ m}^2 \\ &= 375\sqrt{15} \text{ m}^2 \end{aligned}$$

$$\text{Perimeter of the park} = AB + BC + CA = 250 \text{ m}$$

$$\begin{aligned} \text{Length of the wire needed for fencing} &= 250 \text{ m} - 3 \text{ m} \\ &= 247 \text{ m} \end{aligned}$$

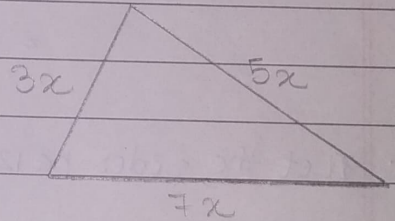
$$\text{Cost of fencing} = 20 \times 247 = ₹ 4940$$

### EXAMPLE 3:

The sides of a triangular plot are in the ratio of 3:5:7 and its perimeter is 300 m. Find its area.

Ans Let the sides, in metres, be  $3x$ ,  $5x$  and  $7x$ .

$$\begin{aligned} \text{Perimeter of the triangle} &= \\ 3x + 5x + 7x &= 300 \text{ m} \\ 15x &= 300 \\ x &= \frac{300}{15} = 20 \end{aligned}$$



$$\begin{aligned} \text{Sides of the triangle} &= 3 \times 20 = 60 \text{ m} \\ &= 5 \times 20 = 100 \text{ m} \\ &= 7 \times 20 = 140 \text{ m} \end{aligned}$$

$$s = \frac{60 + 100 + 140}{2} = 150 \text{ m}$$

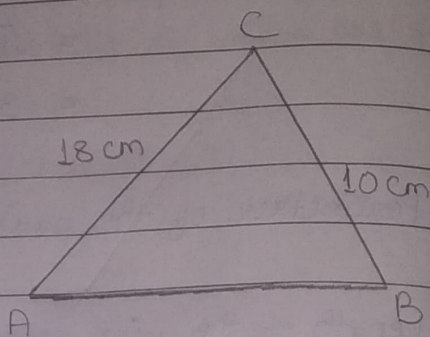
$$\begin{aligned} \text{Area} &= \sqrt{150(150-60)(150-100)(150-140)} \text{ m}^2 \\ &= \sqrt{150 \times 90 \times 50 \times 10} \text{ m}^2 \\ &= 1500\sqrt{3} \text{ m}^2 \end{aligned}$$

### EXERCISE 12-1

4. Perimeter of triangle = 42 cm

$$a = 10 \text{ cm and } b = 18 \text{ cm}$$

$$\begin{aligned} \text{Third side } c &= 42 - (10 + 18) \\ &= 14 \text{ cm} \end{aligned}$$



$$s = \frac{14}{2} = 7 \text{ cm}$$

$$s - a = (7 - 10) = -3 \text{ cm}$$

$$s - b = (7 - 18) = -11 \text{ cm}$$

$$s - c = (7 - 14) = -7 \text{ cm}$$

$$\begin{aligned} \text{Area of triangle} &= \sqrt{s(s-a)(s-b)(s-c)} \\ &= \sqrt{7 \times 3 \times 11 \times 7} \text{ cm}^2 \\ &= 7 \times 3\sqrt{11} \text{ cm}^2 \\ &= 21\sqrt{11} \text{ cm}^2 \end{aligned}$$

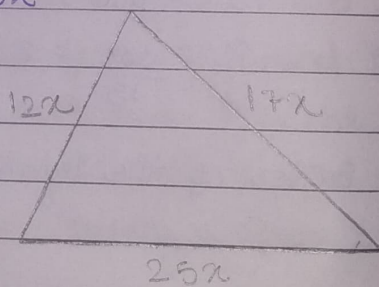
5. Let the sides be  $12x$ ,  $17x$  and  $25x$

Perimeter of triangle =

$$12x + 17x + 25x = 540 \text{ cm}$$

$$54x = 540 \text{ cm}$$

$$x = \frac{540}{54} = 10 \text{ cm}$$



$$\text{Sides of triangle} = 12 \times 10 = 120 \text{ cm}$$

$$17 \times 10 = 170 \text{ cm}$$

$$25 \times 10 = 250 \text{ cm}$$

$$s = \frac{120 + 170 + 250}{2} = \frac{540}{2} = 270 \text{ cm}$$

$$\begin{aligned} \text{Area} &= \sqrt{270(270-120)(270-170)(270-250)} \\ &= \sqrt{270 \times 150 \times 100 \times 20} \\ &= 9000 \text{ cm}^2 \end{aligned}$$