

# Mathematics

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

(Class – IX)

## Exercise 12.1

### Question 7:

The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude

- (A)  $16\sqrt{5}$  cm      (B)  $10\sqrt{5}$  cm      (C)  $24\sqrt{5}$  cm      (D) 28 cm

### Answer 7:

- (C)  $24\sqrt{5}$  cm

### Solution:

Let ABC be a triangle in which sides AB = 35cm, BC = 54cm and CA = 61cm.

Now, semi – perimeter of a triangle,

$$s = \frac{a + b + c}{2} = \frac{35 + 54 + 61}{2} = \frac{150}{2} = 75 \text{ cm}$$

$$[\because \text{semi – perimeter, } s = \frac{a+b+c}{2}]$$

$$\therefore \text{Area of a triangle } \Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

[by Heron's formula]

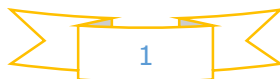
$$= \sqrt{75(75-35)(75-54)(75-61)}$$

$$= \sqrt{75 \times 40 \times 21 \times 14}$$

$$= \sqrt{25 \times 3 \times 4 \times 2 \times 5 \times 7 \times 3 \times 7 \times 2}$$

$$= 5 \times 2 \times 2 \times 3 \times 7\sqrt{5}$$

$$= 420\sqrt{5} \text{ cm}^2 .$$



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Also Area of  $\Delta ABC = \frac{1}{2} \times AB \times \text{Altitude}$

$$\Rightarrow \frac{1}{2} \times 35 \times CD = 420\sqrt{5}$$

$$\Rightarrow CD = \frac{420 \times 2\sqrt{5}}{35}$$

$$\therefore CD = 24\sqrt{5}$$

Hence, the length of altitude is  $24\sqrt{5}$  .

