

Mathematics

(www.tiwariacademy.net)

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

(Class – IX)

Exercise 12.1

Question 8:

The area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm, is

- (A) $\sqrt{15}$ cm² (B) $\sqrt{\frac{15}{2}}$ cm² (C) $2\sqrt{15}$ cm² (D) $4\sqrt{15}$ cm²

Answer 8:

- (A) $\sqrt{15}$ cm²

Solution:

Let ABC be an isosceles triangle in which AB = AC = 4cm and BC = 2cm.

In right angled $\triangle ADB$

$$AB^2 = AD^2 + BD^2 \quad \text{[by Pythagoras theorem]}$$

$$\Rightarrow (4)^2 = AD^2 + 1$$

$$\Rightarrow (AD)^2 = 16 - 1$$

$$\Rightarrow (AD)^2 = 15$$

$$\therefore AD = \sqrt{15} \text{ cm}$$

[taking positive square root because length is always positive]

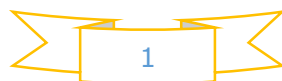
$$\therefore \text{Area of } \triangle ABC = \frac{1}{2} \times BC \times AD$$

$$[\because \text{area of a triangle} = \frac{1}{2} (\text{base} \times \text{height})]$$

$$= \frac{1}{2} \times 2 \times \sqrt{15} = \sqrt{15} \text{ cm}^2$$

Alternate Method

We know that, area of isosceles triangle = $\frac{a}{4} \sqrt{4b^2 - a^2}$



Mathematics

(www.tiwariacademy.net)

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

(Class – IX)

Where, b is the length of equal sides and a is the length of the base.

Hence, the length of the side be and $b = 4$ cm and $a = 2$ cm .

∴ Area of an isosceles triangle

$$= \frac{2\sqrt{4(4)^2 - 4}}{4}$$

$$= \frac{\sqrt{64 - 4}}{2}$$

$$= \frac{\sqrt{60}}{2}$$

$$= \frac{2\sqrt{15}}{2}$$

$$= \sqrt{15} \text{ cm}^2$$

