Short Answer Type Questions – I

[2 marks]

Que 1. The base of a right-angled triangle measures 4 cm and its hypotenuse measures 5 cm. Find the area of the triangle.

Sol.

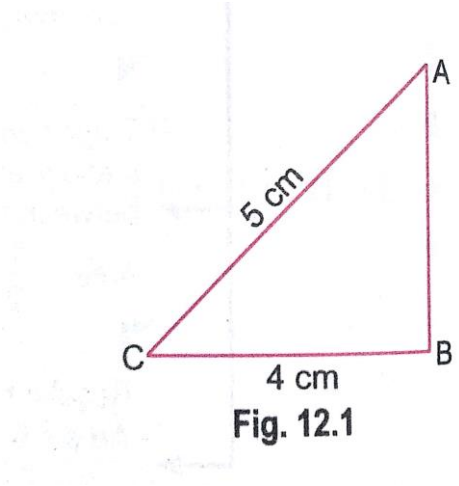

Fig. 12.1

In right-angled triangle ABC

$AB^2 + BC^2 = AC^2$ (By Pythagoras Theorem)

$\Rightarrow \quad AB^2 + 4^2 = 5^2$

$\Rightarrow \quad AB^2 + = 25 - 16 = 9$

$\Rightarrow \quad AB = 3$ cm

$\therefore$ Area of $\Delta ABC = \frac{1}{2} BC \times AB = \frac{1}{2} \times 4 \times 3 = 6cm^2$

Que 2. If the area of an equilateral triangle is $36\sqrt{3}$ cm², find its height.

Sol. Area of equilateral triangle $= \frac{\sqrt{3}}{4} a^2$

$$\frac{\sqrt{3}}{4} a^2 = 36\sqrt{3} \quad \Rightarrow \quad a^2 = 4 \times 36$$

$\Rightarrow \quad a = \sqrt{4 \times 36} = 12cm$

Height of equilateral triangle $= \frac{\sqrt{3}}{2} a = \frac{\sqrt{3}}{2} \times 12 = 6\sqrt{3}cm$

Que 3. If the area of an equilateral triangle is $81\sqrt{3}$ cm², find its perimeter.

Sol. Area of equilateral triangle $= \frac{\sqrt{3}}{4} a^2$

$$\frac{\sqrt{3}}{4} a^2 = 81\sqrt{3} \quad \Rightarrow \quad a^2 = 81 \times 4 \quad \Rightarrow a = 18 \text{ cm}$$

∴ Perimeter of equilateral triangle = 3a = 3×18 = 54 cm

Que 4. The sides of a triangle are 8 cm, 15 cm and 17 cm. Find its area.

Sol. Let a = 8cm, b = 15cm, c = 17 cm

$$s = \frac{a+b+c}{2} = \frac{8+15+18}{2} = \frac{40}{2} = 20cm$$

∴ Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{20(20-8)(20-15)(20-17)}$

$= \sqrt{20 \times 12 \times 5 \times 3} = 60\ cm^2$

Que 5. Find the area of a trapezium whose parallel sides are 25 cm and 13 cm long and the distance between them is 8 cm.

Sol. Area of trapezium $= \frac{1}{2}$ (Sum of parallel sides) × (Perpendicular distance between them)

$$= \frac{1}{2}(25\ +\ 13)\ \times\ 8\ =\ 152\ cm^2$$

Que 6. Find the area of an isosceles triangle, whose equal sides are of length 15 cm each and third side is 12 cm.

Sol. Area of isosceles triangle $= \frac{12}{4}\sqrt{4 \times 15^2 - 12^2} = \frac{12}{4}\sqrt{900 - 144}$

$$= 3\sqrt{756} = 3 \times 6\sqrt{21} = 18\sqrt{21}\ cm^2$$

Que 7. If the perimeter of an isosceles triangle is 11 cm and its base is 5 cm, its area is $\frac{5}{4}\sqrt{11}\ cm^2$. State true or false and give reason.

Sol. True, 2b + a = 11 ⇒ 2b + 5 = 11

⇒ 2b = 6 ⇒ b = 3

∴ Area of isosceles triangle $= \frac{a}{4}\sqrt{4b^2 - a^2}$

$$= \frac{5}{4}\sqrt{4 \times 3^2 - 5^2} = \frac{5}{4}\sqrt{11}cm^2$$

Que 8. An isosceles right triangle has area 8 cm². Find the length of its hypotenuse

Sol.

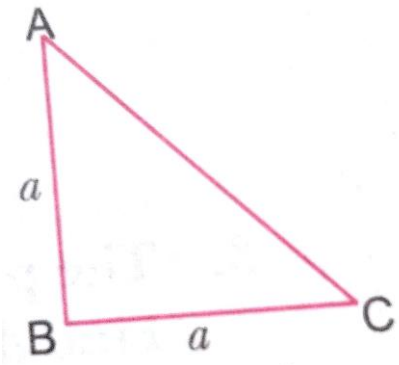

Fig. 12.2

Area $= \frac{1}{2}a^2 \Rightarrow \frac{1}{2}a^2 = 8$

$\Rightarrow a^2 = 16 \Rightarrow a = 4\,cm$

Hypotenuse$= \sqrt{2}a = \sqrt{2.4} = 4\sqrt{4}cm.$

Que 9. The altitude of an equilateral triangle is $3\sqrt{5}$ cm. Find its area.

Sol. Altitude $= \frac{\sqrt{3a}}{2} \Rightarrow \frac{\sqrt{3}}{2}a = 3\sqrt{3} \Rightarrow a = 6\,cm$

Area of equilateral triangle$= \frac{\sqrt{3}}{4}a^2 = \frac{\sqrt{3}}{4} \times 6^2 = 9\sqrt{3}\,cm^2.$

Que 10. If the area of an equilateral triangle is $16\sqrt{3}$ cm², then find the perimeter of the triangle.

Sol. Area of equilateral triangle $= \frac{\sqrt{3}}{4}a^2$

$\Rightarrow \frac{\sqrt{3}}{4}a^2 = 16\sqrt{3} \quad \Rightarrow a^2 = 64 \quad \Rightarrow a = 8\,cm$

Perimeter of the equilateral triangle = 3a = 3 × 8 = 24 cm