Exercise 17A

Question 20:
Perimeter of an isosceles triangle = 42 cm

(i) Let each side be a cm, then base = $\frac{3}{2}$a cm

$\therefore$ perimeter = (2a + b) cm

$$= \left(2a + \frac{3}{2}a\right) cm = 42 \text{ cm}$$

$$= \frac{7a}{2} = 42 \Rightarrow a = \frac{42 \times 2}{7} = 12 \text{ cm}$$

Hence each side = 12 cm and Base = $\frac{3}{2} \times 12 = 18$ cm

(ii) Area of triangle = $\frac{1}{4}b\sqrt{4a^2 - b^2}$ sq. unit

$$= \frac{1}{4} \times 18\sqrt{4 \times 12^2 - 18^2} \text{ cm}^2$$

$$= \frac{1}{4} \times 18 \times \sqrt{576 - 324} \text{ cm}^2$$

$$= \frac{1}{4} \times 18 \times \sqrt{252} \text{ cm}^2$$

Area = $\frac{1}{4} \times 18 \times 15.87 \text{ cm}^2 = 71.42 \text{ cm}^2$

(iii) Height of the triangle = $\frac{\sqrt{4a^2 - b^2}}{2}$ units

$$= \left(\frac{\sqrt{4 \times 12 \times 12 - 18 \times 18}}{2}\right) \text{cm}$$

$$= \frac{\sqrt{576 - 324}}{2} \text{ cm} = \frac{15.87}{2} = 7.94 \text{ cm}$$

Question 21:
Let the height be h cm, then a= (h + 2) cm and b = 12 cm

$$\frac{1}{2} \times 12 \times h = \frac{1}{4} \times 12 \times \sqrt{4(h+2)^2 - 144}$$

$$6h = 6\sqrt{(h+2)^2 - 36}$$

$$h = \sqrt{(h+2)^2 - 36}$$

Squaring both sides,

$$h^2 = (h+2)^2 - 36$$

$$h^2 = h^2 + 4 + 4h - 36$$

$$-4h = -32 \Rightarrow h = 8 \text{cm}$$

Therefore, a = h + 2 = (8 + 2)cm = 10 cm

Area of isosceles triangle $= \frac{1}{4}b \times \sqrt{4a^2 - b^2}$

$$= \frac{1}{4} \times 12 \times \sqrt{4 \times (10)^2 - (12)^2}$$

$$= 3\sqrt{400 - 144} = 3 \times \sqrt{256}$$

$$= 3 \times 16 = 48 \text{ cm}^2$$

Hence, area of the triangle = 48 cm².

********** END *********