HERON's FORMULA

Ex·12·1

1. Ans· Perimeter · of equilateral $\triangle$ = 180 cm

$$a = \frac{180}{3}$$

$$= 60\,m$$

Area · of the signal bond $= \frac{\sqrt{3}}{4}a^2$

$$= \frac{\sqrt{3}}{4} \times \overset{30}{60} \times \overset{30}{60}$$

$$= 900\sqrt{3}\,cm^2$$

2. Ans· $a = 122\,m$

$b = 22\,m$

$c = 120\,m$

s ⇒ $\frac{a+b+c}{2}$ ⇒ $\frac{122+20+120}{2}$ ⇒ $\frac{164}{2}$ = 132 m

$s-a = 132-122 = 10$

$s-b = 132-22 = 110$

$s-c = 132-120 = 12$

Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$$= \sqrt{132\,(10)\,(110)\,(12)}$$

$$= \sqrt{11 \times 12 \times 10 \times 11 \times 10 \times 12}$$

$$= 11 \times 12 \times 10$$

$$= 1320\,m^2$$

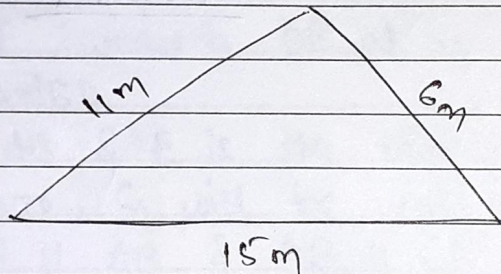Rent for 1m² per year = ₹5000

Rent for 1m² for 1 month = $\dfrac{5000}{12}$

Rent for 1m² for 3 months = $\dfrac{5000 \times \cancel{3}}{\cancel{12}_4}$

$$= ₹1250$$

Rent for 1320m² = ₹1250 × 1320

$$= ₹1650000$$

3. Ans -

a = 11 m

b = 6 m

c = 15 m

s =) $\dfrac{a+b+c}{2}$ =) $\dfrac{11+6+15}{2}$ =) $\dfrac{32}{2}$ = 16 m

Area of △ = $\sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{16(16-11)(16-6)(16-15)}$

$= \sqrt{16(5)(10)(1)}$

$= \sqrt{2\times2\times2\times2 \times 5 \times 2 \times 5 \times 1}$

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

$= 20\sqrt{2}\ m^2$

4. Ans. $a = 18cm$

$b = 10cm$

$c = n\ cm$

Perimeter $= 42\ cm$

$\Rightarrow$ $a + b + c = 42\ cm$

$\Rightarrow$ $18 + 10 + n = 42$

$\Rightarrow$ $28 + n = 42$

$\Rightarrow$ $n = 42 - 28$

$n = \underline{14\ cm}$

$\therefore$ $a = 18cm$

$b = 10cm$

$c = 14\ cm$

$s \Rightarrow \dfrac{a + b + c}{2}$ $\Rightarrow \dfrac{18 + 10 + 14}{2}$ $\Rightarrow \dfrac{42}{2} = 21\ cm$

$s - a = 21 - 18 = 3\ cm$

$s - b = 21 - 10 = 11\ cm$

$s - c = 21 - 14 = 7\ cm$

Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{21\,(3)\,(11)\,(7)}$

$= \sqrt{3 \times 7 \times 3 \times 11 \times 7}$

$= 3 \times 7 \times \sqrt{11}$

$= \underline{21\sqrt{11}\ cm^2}$

5.Ans - Let a = 12u

b = 17u

c = 25u

Perimeter = 540 cm

⇒) a+b+c = 540 cm

⇒) 12u + 17u + 25u = 540

⇒) 54u = 540

$x = \dfrac{540}{54}$ ¹⁰

= 10 cm

∴ a = 12×10

= 120 cm

b = 17×10

= 170 cm

c = 25×10

= 250 cm

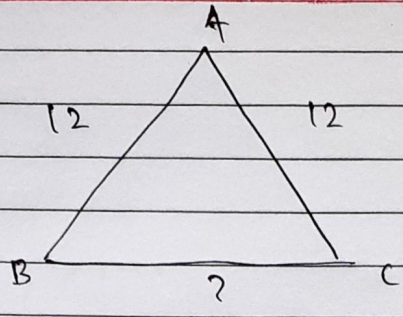s ⇒) $\dfrac{a+b+c}{2}$ ⇒) $\dfrac{120+170+250}{2}$ ⇒) $\dfrac{540}{2}$ ⇒) 270 cm

s-a = 270 - 120 = 150

s-b = 270 - 170 = 100

s-c = 270 - 250 = 20

Area = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{270 \,(150)(100)(20)}$

= $\sqrt{27 \times 10 \times 15 \times 10 \times 10 \times 2 \times 10}$

= $\sqrt{3\times3\times3 \times 2 \times 5 \times 3 \times 5 \times 2 \times 5 \times 2 \times 2 \times 5 \times 2 \times 5}$

⇒) 3×3×2×5×5 × 2×2×5 = 9000 cm²

6·Anu-

A

12   12

B
?   C

$a = 12$

$b = 12$

$c = u$

Perimeter $= 30\,cm$

$\Rightarrow$ $12 + 12 + u = 30\,cm$

$\Rightarrow$ $24 + u = 30\,cm$

$\Rightarrow$ $u = 30 - 24$

$= 6\,cm$

$\therefore$ $a = 12\,cm$

$b = 12\,cm$

$c = 6\,cm$

$S = $ $\dfrac{a+b+c}{2}$ $\Rightarrow$ $\dfrac{12+12+6}{2}$ $\Rightarrow$ $\dfrac{30}{2} = 15\,cm$

$S - a = 15 - 12 = 3\,cm$

$S - b = 15 - 12 = 3\,cm$

$S - c = 15 - 6 = 9\,cm$

Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{15(3)(3)(9)}$

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

$= 3 \times 3 \sqrt{15}$

$= 9\sqrt{15}\,cm^2$