Ch-12

Exercise 12.1

5) Area of triangle $= \sqrt{S(S-a)(S-b)(S-c)}$

Here, S is the semi-perimeter, and a, b, c are the sides of the triangle.

Crime Perimeter = 540 cm

Semi-Perimeter $= S = \frac{P}{2}$,

$S = \frac{540}{2}$

$S = 270$ cm.

Ration of sides are 12 : 17 : 25

Let sides be $a = 12x$

$b = 17x$

$c = 25x$

Now,

$P = 540$ cm

Total $\Rightarrow 12x + 17x + 25x = 540$

$54x = 540$

$x = 540/54$

$x = 10$ cm

So,

$12 \times 10 = 120$ cm

$17 \times 10 = 170$ cm

$25 \times 10 = 250$ cm.

Area of triangle

$\Rightarrow \sqrt{270(270-120)(270-170)(270-250)}$

$\Rightarrow \sqrt{270 \times 150 \times 100 \times 20}$

$\Rightarrow \sqrt{(27 \times 15 \times 2) \times (10)^5}$

$\Rightarrow \sqrt{(27 \times 30) \times (10)^5}$

$\Rightarrow \sqrt{(81) \times (10)^6}$

$\Rightarrow \sqrt{(81)} \times \sqrt{(10)^6}$

$\Rightarrow \sqrt{9^2} \times \sqrt{(10^6)^{\frac{1}{2}}}$

$\Rightarrow 9 \times (10^3)$

$= 9000$

The area = 9000 cm^2

6.) Area of triangle $= \sqrt{S-(S-a)(S-b)(S-c)}$

Here, s is the semi-perimeter and a, b, c are the sides of the triangle.

Given,

So, $a = b = 12\text{cm}$ and Perimeter $= 30\text{cm}$

Semi-Perimeter $= S = \frac{P}{2}$

$S = \frac{30}{2}$

$S = 15\text{cm}$

We need to find C

$P = 30\text{cm}$

$a + b + C = 30\text{cm}$

$12\text{cm} + 12\text{cm} + C = 30\text{cm}$

$24\text{cm} + C = 30$

$C = 30 - 24$

$C = 6\text{cm}$

Area of triangle,

$$\sqrt{15(15-12)(15-12)(15-6)}$$

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

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

$$= \sqrt{9 \times 9 \times 15}$$

$$= \sqrt{9^2} \times \sqrt{15}$$

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

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

1.) Each side of the triangle $= a$

Perimeter of the triangle $= 3a$

$$\therefore S = \frac{3a}{2}$$

∴ Area of the single board (triangle)

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

$$= (S-a)\sqrt{S(S-a)}$$

$$= \left(\frac{3}{2}a - a\right)\sqrt{\frac{3a}{2}\left(\frac{3a}{2} - a\right)}$$

$$= \frac{a}{2}\sqrt{\frac{3a^2}{4}}$$

$$= \frac{a}{2}\times\frac{a}{2}\sqrt{3}$$

$$= \frac{a^2}{4}\sqrt{3}$$

Perimeter = 180 cm

Each side of the triangle $= \frac{180}{3}$ cm

$= 60$ cm

Area of the triangle $= \frac{(60)^2}{4}\times\sqrt{3}$

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

2.) Here, $a = 122$ m, $b = 120$ and $c = 22$ m

Area of the triangular side walls

$s = \frac{122+120+22}{2}$ m $= 132$ m

Area of triangle $=$

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

$= \sqrt{132(132-122)(132-120)(132-22}$

$= \sqrt{132 \times 10 \times 12 \times 110} m^2$

$= 1320 m^2$

Rent of $1 m^2$ of the wall for 1 year $= Rs\ 5000$

$\therefore$ Rent of $1 m^2$ of the wall for 1 month $= Rs\ \frac{5000}{12}$

$\therefore$ Rent of the complet wall for 3 month

$= Rs\ \frac{5000}{2} \times 1320 \times 3$

$= Rs\ 16,50,000$

12.1

3) Here $a = 15m$, $b = 11m$, $c = 6m$

$$\therefore s = \frac{a+b+c}{2}$$

$$= \frac{15+11+6}{2}$$

$$= 16m$$

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

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

$$= \sqrt{16 \times 1 \times 5 \times 10}$$

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

∴ Hence, the area painted in colours $= 20\sqrt{2}\ m^2$

4.) Here $a = 18\text{cm}$, $b = 10\text{cm}$, $C = ?$

Perimeter of the triangle $= 42\text{cm}$

$\Rightarrow a + b + C = 42$

$\Rightarrow 18 + 10 + C = 42$

$\Rightarrow C = 42 - 28 = 14$

Now, $s = \frac{a+b+c}{2} = \frac{42}{2}\text{cm} = 21\text{cm}$

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

$= \sqrt{21(21-18)(21-10)(21-14)}$

$= \sqrt{21 \times 3 \times 11 \times 7}$

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

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

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