

30/9/21

HW2

12.1

1. ~~Each~~ Let each side of the equilateral triangle be a .
Semi-perimeter of the triangle,

$$s = \frac{a+a+a}{2} = \frac{3a}{2}$$

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

$$= \sqrt{s(s-a)^3}$$

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

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

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

Now its perimeter is 180 cm

$$\therefore a + a + a = 180 \text{ cm}$$

$$\Rightarrow 3a = 180 \text{ cm}$$

$$\Rightarrow a = \frac{180}{3} \text{ cm} = 60 \text{ cm}$$

Thus, area of the triangle = $\frac{\sqrt{3}}{4} a^2$

$$= \frac{\sqrt{3}}{4} \times 60^2$$

$$= 900\sqrt{3}$$

2. Let the side of the triangle will be

$$a = 122 \text{ m}, b = 120 \text{ cm}, c = 22 \text{ m}$$

$$s = \frac{122 + 120 + 22}{2} = \frac{264}{2} = 132 \text{ m}$$

$$\text{Area} = \sqrt{132(132-122)(132-120)(132-22)} \text{ m}^2$$

$$= \sqrt{32 \times 10 \times 12 \times 110} \text{ m}^2$$

$$= \sqrt{12 \times 11 \times 10 \times 12 \times 11 \times 10} \text{ m}^2 = 1320 \text{ m}^2$$

Rate for 1 year per m² = Rs 5000
∴ rate for 3 months per m² = $5000 \times \frac{3}{12}$

$$\begin{aligned} &= \text{Rate for 3 months for } 1920 \text{ m}^2 = \\ &5000 \times \frac{3}{12} \times 1920 \\ &= 16,80,000 \end{aligned}$$

Q2

For ΔABC

$AB = 3 \text{ cm}$, $BC = 5 \text{ cm}$, $AC = 4 \text{ cm}$

$$\Delta a^2 + c^2 = b^2$$

∴ ΔABC is right angle with $\angle B = 90^\circ$

$$\begin{aligned} \therefore \text{Area of right } \Delta ABC &= \frac{1}{2} \times b \times h \\ &= \frac{1}{2} \times 3 \times 4 = 6 \text{ cm} \end{aligned}$$

For ΔACD

$a = 4 \text{ cm}$, $b = 5 \text{ cm}$, $c = 5 \text{ cm}$

$$s = \frac{4+5+5}{2} = \frac{14}{2} = 7 \text{ cm}$$

$$\begin{aligned} \text{Area} &= \sqrt{s(s-a)(s-b)(s-c)} \\ &= \sqrt{7 \times 3 \times 2 \times 2} \\ &= 4\sqrt{3} \text{ cm}^2 \end{aligned}$$

4. $a = 26 \text{ cm}$, $b = 28 \text{ cm}$, $c = 30 \text{ cm}$

$$\therefore s = \frac{26+28+30}{2} = \frac{84}{2} = 42$$

$$\begin{aligned} \therefore \text{Area of } \Delta &= \sqrt{42(42-26)(42-28)(42-30)} \\ &= \sqrt{42 \times 16 \times 14 \times 12} \\ &= \sqrt{6 \times 7 \times 4 \times 4 \times 9 \times 2 \times 6 \times 2} \\ &= 6 \times 4 \times 9 \times 2 = 836 \text{ cm}^2 \end{aligned}$$