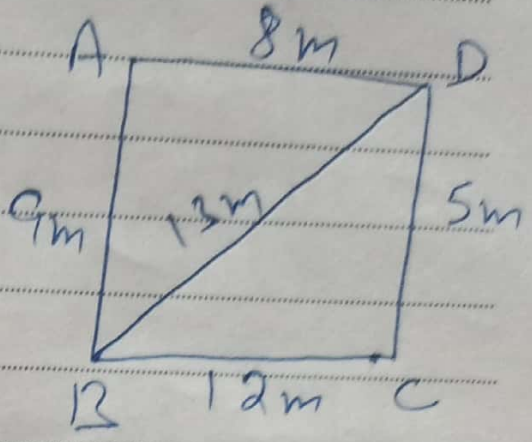
Exercise → 12.2



Sol:- (1) $AB = 9m$

$BC = 12m$

$CD = 5m$

$AD = 8m$

$\angle C = 90^\circ$

Join BD.

$\triangle BCD$ is a rt. angled triangle.

Using Pythagoras theorem.

$$BD = \sqrt{BC^2 + CD^2}$$

$$= \sqrt{(12)^2 + (5)^2}$$

$$= \sqrt{144 + 25}$$

$$= \sqrt{169}$$

$$BD = 13m$$

Area of rt. angled $\triangle BCD = \frac{1}{2} \times BC \times CD$

$$= \frac{1}{2} \times 12 \times 5$$

$$= 30 m$$

In $\triangle ABD$

$a = 8m, \; b = 9m, \; c = 13m$

Semi Perimeter (S) = $\frac{a+b+c}{2}$

$= \frac{8+9+13}{2}$

$= \frac{30}{2}$

$= 15m$

Using Heron's formula

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

$= \sqrt{15(15-8)(15-9)(15-13)}$

$= \sqrt{15 \times 7 \times 6 \times 2}$

$= \sqrt{3 \times 5 \times 7 \times 2 \times 3 \times 2}$

$= 6\sqrt{35}\ m^2$

$= 6 \times 5.916$

$= 35.496\ m^2$

$[\sqrt{35} = 5.916]$

Area of park = ar. ($\triangle BCD$) + ar. ($\triangle ABD$)

$= 30 + 35.496$

$= 65.496\ m^2$

$= 65.5\ m^2$ (app)

ਅਪ੍ਰੈਲ
April 2010

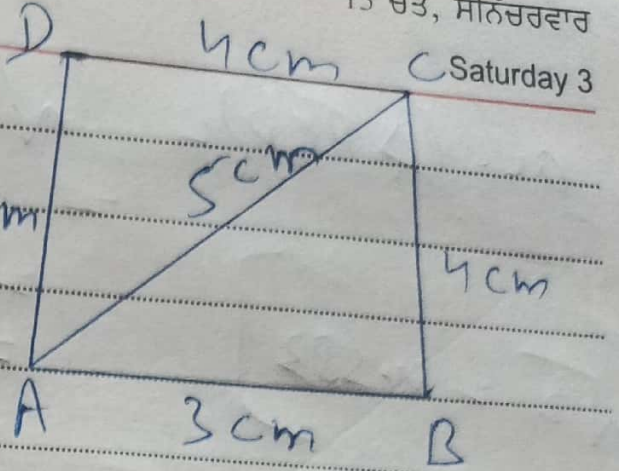
13 ਚੇਤ, ਸਨਿੱਚਰਵਾਰ
Saturday 3

Sol:- (2) In $\triangle ABC$

$AB(a) = 3cm$

$BC(b) = 4cm$

$AC(c) = 5cm$



Semi Perimeter

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

$$= \frac{3+4+5}{2}$$

$$= \frac{12}{2} = 6$$

$= 6cm$

Using Heron's formula

$$\text{ar.}(\triangle ABC) = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{6(6-3)(6-4)(6-5)}$$

$$= \sqrt{6 \times 3 \times 2 \times 1}$$

$$= \sqrt{6 \times 6}$$

$= 6 cm^2$

In $\triangle ACD$

$AD(a) = 5cm$, $CD(b) = 4cm$, $AC(c) = 5c$

$$s = \frac{a+b+c}{2} = \frac{5+4+5}{2}$$

$$= \frac{14}{2} = 7cm$$

ar. $(\triangle ACD) = \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{7(7-5)(7-4)(7-5)}$

$= \sqrt{7 \times 2 \times 3 \times 2}$

$= 2\sqrt{21}$

$= 2 \times 4.583$

$= 9.166 \text{ cm}^2$

$[\sqrt{21} = 4.583]$

ar. (Quad. ABCD) = ar. $(\triangle ABC)$ + ar. $(\triangle ACD)$

$= 6 + 9.166$

$= 15.166 \text{ cm}^2$

$= 15.2 \text{ cm}^2$ (aff.)

Sol:- (3) In Part I

$a = 5\text{cm}, b = 5\text{cm}, c = 1\text{cm}$

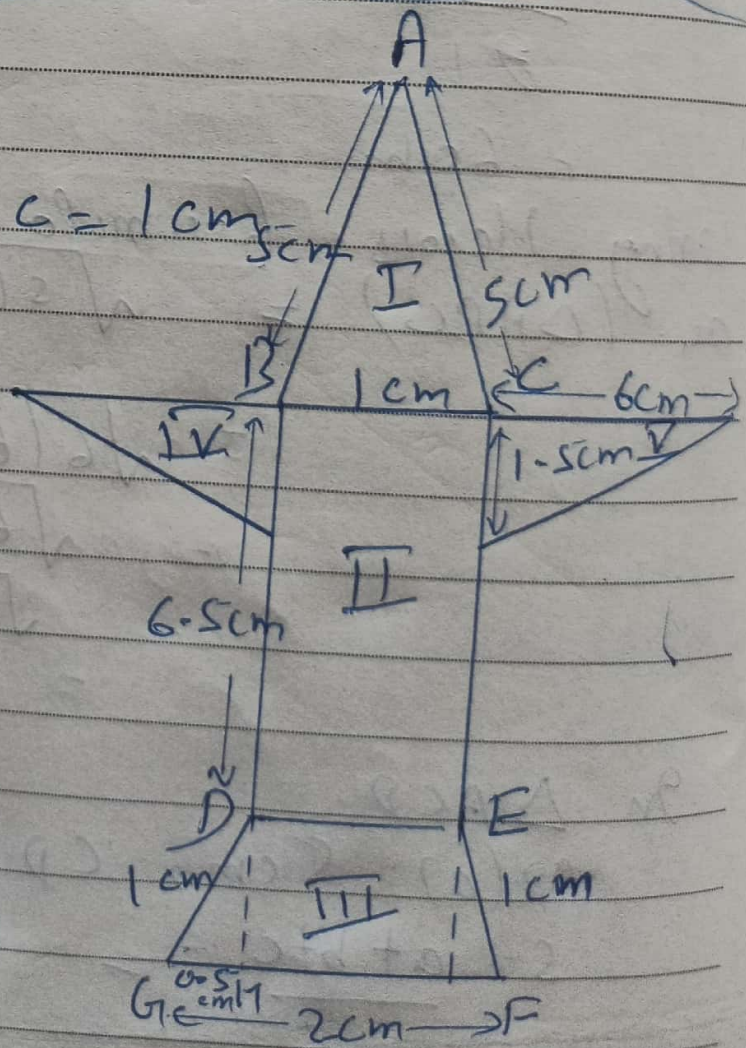
Semi Perimeter

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

$= \frac{5+5+1}{2}$

$= \frac{11}{2}$

$= 5.5\text{cm}$



ar. of Part I (triangle) $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{5.5(5.5-5)(5.5-5)(5.5-1)}$

$= \sqrt{5.5 \times 0.5 \times 0.5 \times 4.5}$

$= \sqrt{0.5 \times 11 \times 0.5 \times 0.5 \times 0.5 \times 3 \times 3}$

$= 0.5 \times 0.5 \times 3 \times \sqrt{11}$

$= 0.75 \times 3.31$

$= 2.4825 \text{ cm}^2$

$[\sqrt{11} = 3.31]$

ar. of Part II (rectangle) $=$ Length $\times$ breadth

$= 6.5 \times 1$

$= 6.5 \text{ cm}^2$

ar. of part III (Trapezium) $= \frac{1}{2}(DE + GF) \times \sqrt{DG^2 - GH^2}$

$= \frac{1}{2} \times (1+2) \times \sqrt{(1)^2 - (0.5)^2}$

$= \frac{1}{2} \times 3 \times \sqrt{1 - 0.25}$

$= \frac{3}{2} \times \sqrt{0.75}$

$= \frac{3}{2} \times \sqrt{\frac{75}{100} \times 3}$

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

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

$[\sqrt{3} = 1.732]$

$= \frac{3}{4} \times 1.732$

$= \frac{5.196}{4}$

$= 1.299 \text{ cm}^2$

ar. of part IV and V = $2 \times \left(\frac{1}{2} \times 1 \times 5 \times 6\right)$ (triangle)

$= 2 \times 4.5$

$= 9 \text{ cm}^2$

Total area = $2.4825 + 6.5 + 1.299 + 9$

$= 19.28 \text{ cm}^2$

Sol:- (4) $a = 26\text{cm}$

$b = 28\text{cm}$

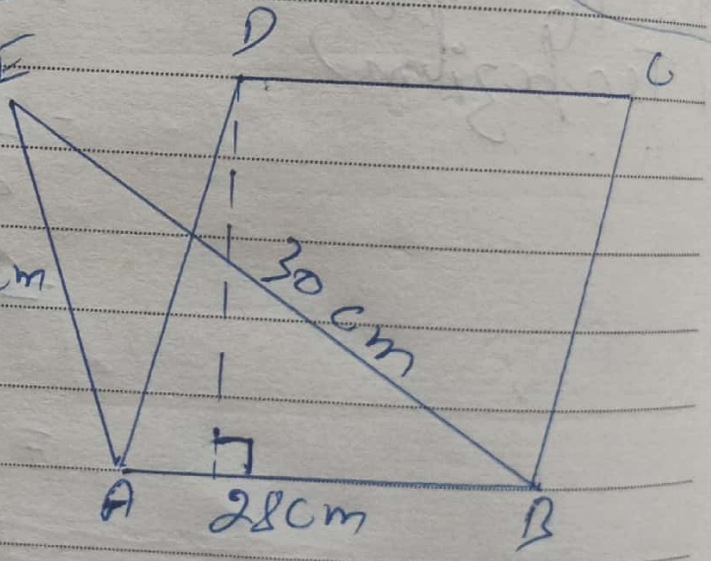
$c = 30\text{cm}$

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

$= \frac{26+28+30}{2}$

$= \frac{84}{2}$

$= 42\text{cm}$



Using Heron's formula

ar. ($\triangle$ARE) = $\sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{42(42-26)(42-28)(42-30)}$

$= \sqrt{42 \times 16 \times 14 \times 12}$

$= \sqrt{2\times3\times7\times2\times2\times2\times2\times2\times7\times2\times2\times3}$

$= 2\times2\times2\times2\times3\times7$

$= 336\ cm^2$

ar. ($\triangle$ADE) = ar. (Parallelogram ABCD)

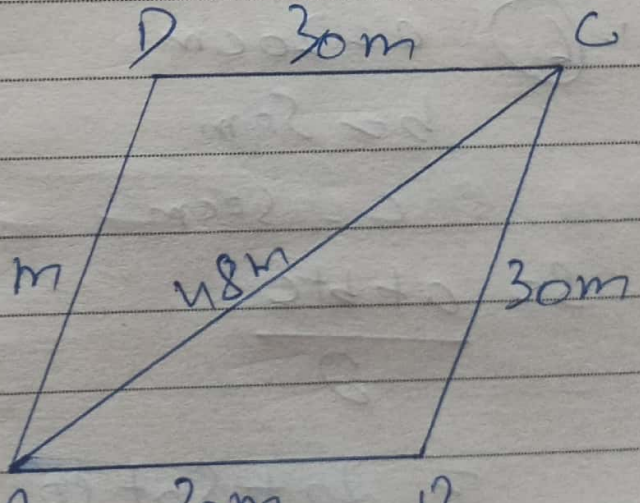
$336 = AB \times DF$

$336 = 28 \times DF$

$12 \quad \frac{336}{28} = DF$

1

$12cm = DF$



Sol: (5th) $a = 30m$

$b = 30m$

$c = 48m$

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

$= \frac{30+30+48}{2}$

$= \frac{108}{2} = 54m$

1

ar. of Rhombus ABCD $= 2 \times \sqrt{s(s-a)(s-b)(s-c)}$

$= 2 \times \sqrt{54(54-30)(54-30)(54-48)}$

$= 2 \times \sqrt{54 \times 24 \times 24 \times 6}$

$= 2 \times \sqrt{2\times3\times3\times3\times2\times2\times2\times2\times3\times2}$

$= 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$

$= 864 m^2$

Field available for 18 cows $= 864 m^2$

" " " 1 cow $= \frac{864}{18}^{48}$

$= 48 m^2$

Sol:- (6) $a = 20cm$

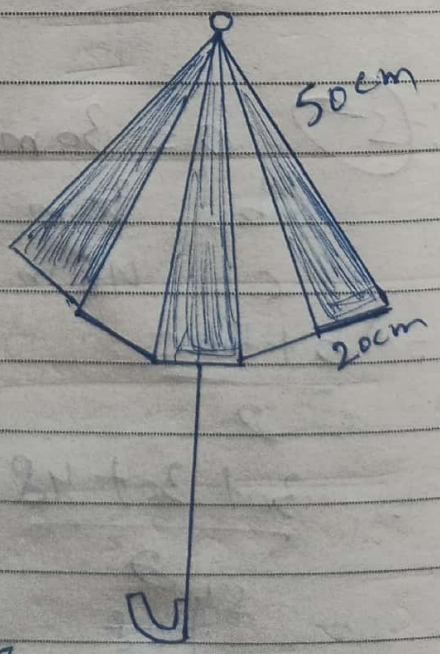
$b = 50m$

$c = 50cm$

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

$= \frac{20+50+50}{2}$

$= \frac{120}{2}^{60} = 60cm$



Using Heron's formula

Area of each triangle

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

$= \sqrt{60(60-20)(60-50)(60-50)}$

$= \sqrt{60 \times 40 \times 10 \times 10}$

$= \sqrt{240000}$

$= \sqrt{2 \times 2 \times 2 \times 3 \times 10000}$

$= 200\sqrt{6}\ cm^2$

There are five pieces in two different colours.

∴ Area of each colour $= 5 \times 200\sqrt{6}$

$= 1000\sqrt{6}\ cm^2$

Sol:- (1) Consider Side of kite (square shape) = a

∴ In $\triangle ACD$

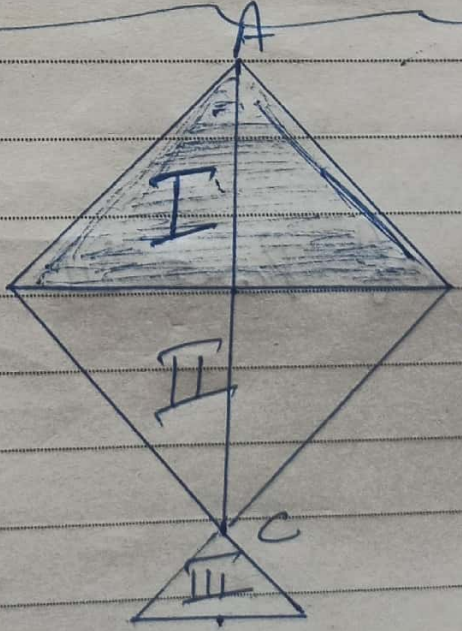
By Phythagoras rule

$AD^2 + DC^2 = AC^2$

$a^2 + a^2 = (32)^2$

$2a^2 = 1024$

$a^2 = \frac{1024}{2} = 512\ cm^2$



Area = $512 cm^2$

Area of Part I = $\frac{1}{2} \times 512$

$= 256 cm^2$

In Part III $a = 6cm$, $b = 6cm$

$c = 8cm$

Semi Perimeter (s) $= \frac{a+b+c}{2}$

$= \frac{6+6+8}{2}$

$= \frac{20}{2} = 10cm$

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

$= \sqrt{10(10-6)(10-6)(10-8)}$

$= \sqrt{10 \times 4 \times 4 \times 2}$

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

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

$= 8\sqrt{5}$

$= 8 \times 2.236$

$= 17.88 cm^2$

$[\sqrt{5} = 2.236]$

Sol: (8) Sides of tiles

$a = 9cm, \quad b = 28cm, \quad c = 35cm$

Semi Perimeter $(s) = \frac{a+b+c}{2}$

$= \frac{9+28+35}{2}$

$= \frac{72}{2}$

$= 36 cm$

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

$= \sqrt{36 \times (36-9)(36-28)(36-35)}$

$= \sqrt{36 \times 27 \times 8 \times 1}$

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

$= 36\sqrt{6}$

$= 36 \times 2.45$

$= 88.2 cm^2$

$[\sqrt{6} = 2.45]$

Area of 16 tiles = 16×88.2

$= 1411.2 cm^2$

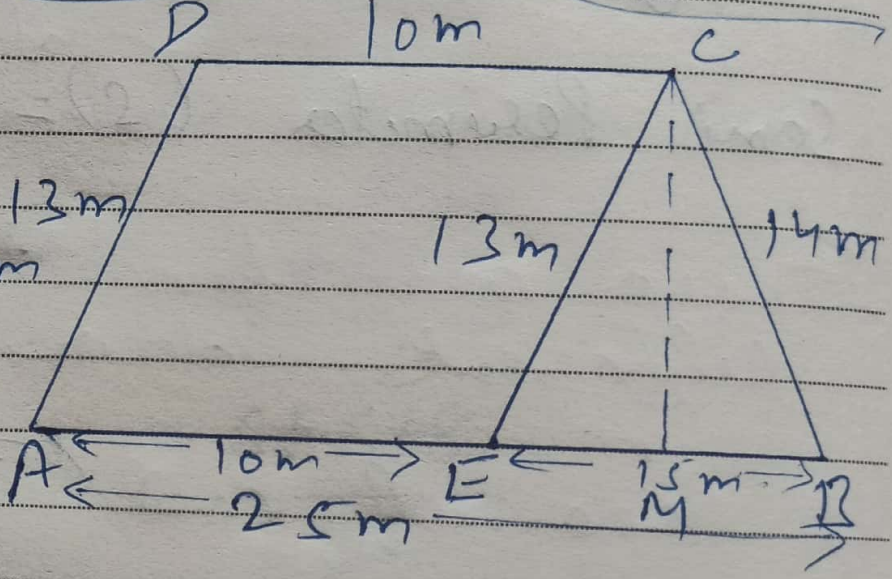
Rate of $1 cm^2$ tile $= 0.50$ ₹

" " $1411.2 cm^2$ " $= 1411.2 \times 0.50$

$= 705.60$ ₹

Sol:- (9) Consider quad. ABCD is a trapezium and AB || DC

Draw CM ⊥ AB and CE || DA



In $\triangle BCE$

$a = 13m, \quad b = 14m, \quad c = 15m$

Semi Perimeter

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

$$= \frac{13+14+15}{2}$$

$$= \frac{42}{2}$$

$$= 21m$$

Using Heron's formula

ar. ($\triangle$BEC) = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{21(21-13)(21-14)(21-15)}$

= $\sqrt{21 \times 8 \times 7 \times 6}$

= $\sqrt{3 \times 7 \times 2 \times 2 \times 2 \times 7 \times 2 \times 3}$

= $2 \times 2 \times 3 \times 7$

= 84 m

now ar. ($\triangle$BEC) = $\frac{1}{2} \times$ EB $\times$ CM

$84 = \frac{1}{2} \times 15 \times CM$

$\frac{84 \times 2}{15} = CM$

$\frac{168}{15} = CM$

11.2 m = CM

Area of trapezium field = $\frac{1}{2} \times (AB + DC) \times CM$

$= \frac{1}{2} \times (25 + 10) \times 11.2$ (5.6)

$= 35 \times 5.6$

$= 196 m^2$