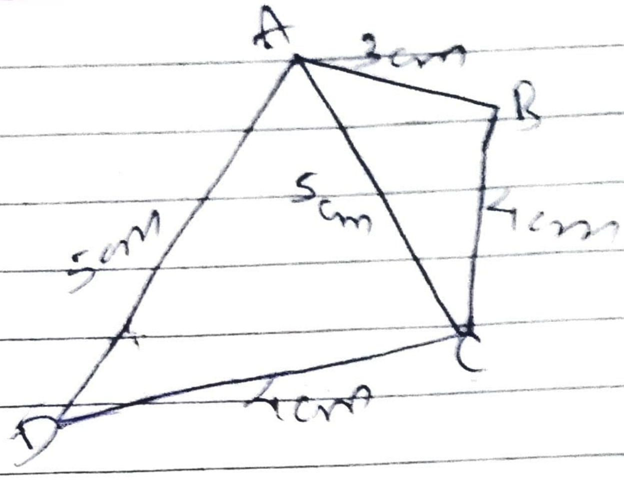
09.08.21, ch-12 Heron's formula.

Ex-12.2

2Ans,



Now,

apply pythagoras theorem in ΔABC,

$AC^2 = AB^2 + BC^2$

$\Rightarrow 5^2 = 3^2 + 4^2$

$\Rightarrow 25 = 25$

Thus,

it can be concluded that ΔABC is a right angled at B.

So,

area of Δ BCD $= \frac{1}{2} \times 3 \times 4 = 6\ cm^2$

The semi perimeter of $\Delta ACD (s) = \frac{5+5+4}{2}$

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

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[using Heron's Formula]

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

$= \sqrt{7(7-5)(7-5)(7-4)}$ cm²

$= \sqrt{7 \times 2 \times 2 \times 3}$ cm²

$= 2\sqrt{3 \times 7}$ cm²

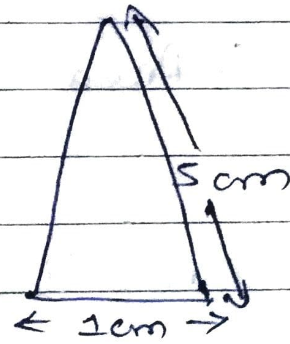
$= 2\sqrt{21}$ cm² $= 9.17$ cm² (approximately)

Area of quadrilateral ABCD =

= Area of ΔABC + Area of ΔABD

$=$ 6 cm² + 9.17 cm² = 15.17 cm²

3Ans I For the triangle I section:



It is an isosceles triangle and the sides are 5 cm, 1 cm and 5 cm

Perimeter $= 11/2$ cm $= 5.5$ cm

[using Heron's foremula]

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

$= \sqrt{5.5(5.5-5)(5.5-5)(5.5-1)}\ cm^2$

$= \sqrt{5.5 \times 0.5 \times 0.5 \times 4.5}\ cm^2$

$= \sqrt{11 \times 0.5 \times 0.5 \times 0.5 \times 9 \times 0.5}\ cm^2$

$= \sqrt{11 \times 9 \times 0.5 \times 0.5 \times 0.5 \times 0.5}\ cm^2$

$= 0.5 \times 0.5 \times 3 \times \sqrt{11}\ cm^2$

$= 0.75\sqrt{11}\ cm^2$

$= 0.75 \times 3.317\ cm^2$

$= 2.488\ cm^2$ (approx)

(ii) For the quadrilateral II section.

This ~~quadr~~ quadrilateral is a rectangle with length and breadth as 6.5 cm and 1 cm respectively.

$\therefore$ Area $= 6.5 \times 1\ cm^2 = 6.5\ cm^2$

(iii) For the quadrilateral III section.

It is a trapezoid with 2 sides as 1 cm each and the third side as 2 cm.

Area of trapezoid = Area of ||gm + Area of equilateral Δ

The perpendicular height of 1 gm will be

$$\left(\sqrt{1^2 - (0.5)^2}\right)$$
$$\sqrt{1 - 0.25}$$
$$= 0.86 \text{ cm}$$

And,

the area of the equilateral triangle will be $\left(\frac{\sqrt{3}}{4 \times a^2}\right) = 0.43$

$\therefore$ Area of the trapezoid $= 0.86 + 0.43$
$= 1.3 \text{ cm}^2$
(approximately)

(iv) For triangle (IV) and (V)

These triangles are 2 congruent right angled triangles having the base as 6 cm and height as 1.5 cm.

Area of IV & V triangles $= 2 \times \left(\frac{1}{2} \times 6 \times 1.5\right) \text{cm}^2$

$= 9 \text{cm}^2$

So,

the total area of the paper used $= (2.488 + 6.5 + 1.3 + 9) \text{ cm}^2$
$= 19.3 \text{ cm}^2$

Ans, Given,

It is given that the parallelogram and triangle have equal areas.

The sides of the triangle are given as 26 cm, 28 cm and 30 cm.

So,

the perimeter $= 26 + 28 + 30 = 84$ cm

And,

its semi perimeter $= \frac{84}{2}$ cm $= 42$ cm

[Using Heron's Formula].

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

$= \sqrt{42(42-26)(42-28)(42-30)}$ cm^2

$= \sqrt{42 \times 16 \times 14 \times 12}$ cm^2

$= 336$ cm^2

Now,

let the height of parallegram be h.

As the area of ||gm = area of Δ

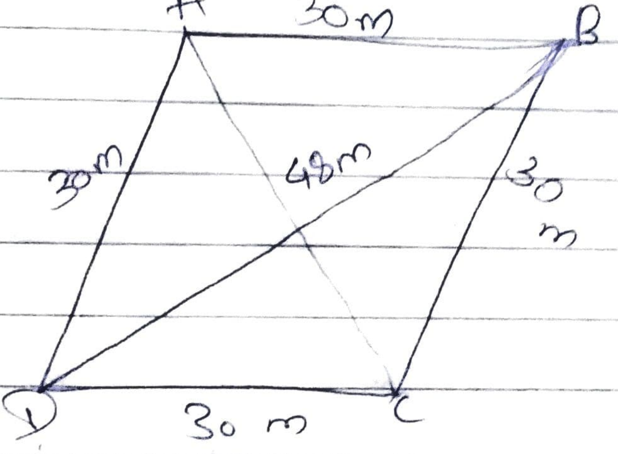
28 cm $\times h = 336$ cm^2

$\therefore h = \frac{336}{28}$ cm

$= 12$ cm

$\therefore$ So, the height of the parallegram is 12 cm

Q.5 Draw a rhombus - shaped field first with the vertices as ABCD. The diagonal AC divides the rhombus into two congruent triangles which are having equal areas. The diagram is as follows.



Consider the triangle BCD,

Its,

Semi-perimeter $= \frac{(48 + 30 + 30)}{2} m = 54 m$

[Using Heron's Formula],

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

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

$= \sqrt{54 \times 6 \times 24 \times 24} \; m^2$

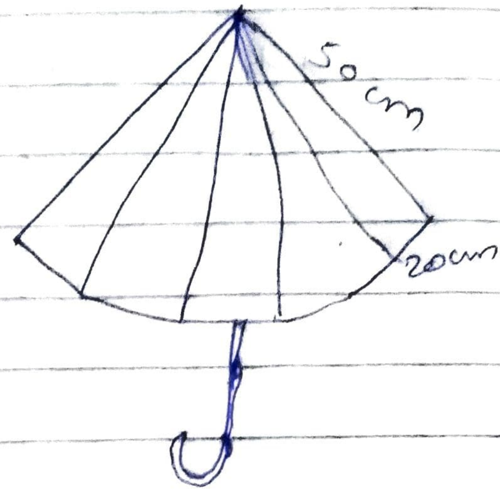
$= 432 m^2$

$\therefore$ Area of field $= 2 \times$ area of the $\triangle BCD$

$= (2 \times 432) m^2$

$= 864 m^2$

Ans



For each triangular piece,

The

Semi - perimeter will be (S) =

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

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

[Using Heron's formula],

Area of Δ piece $= \sqrt{S(s-a)(s-b)(s-c)}$

$= \sqrt{60(60-50)(60-50)(60-20)}$ cm^2

$= \sqrt{60 \times 10 \times 10 \times 40}$ cm^2

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

$\therefore$ The area of all the triangular pieces $= 5 \times 200\sqrt{6}$ cm^2

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