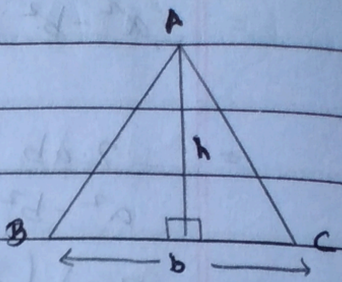
Formulae:

a. Area of triangle $= \frac{1}{2} \times \text{base} \times \text{height}$

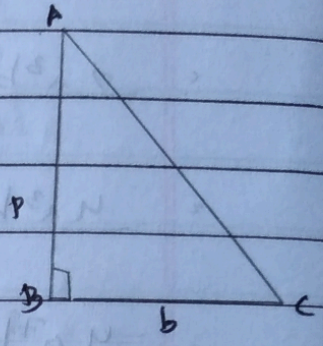
$$= \frac{1}{2} bh$$



b. Area of ~~equ~~ right angled triangle

$$= \frac{1}{2} \times \text{base} \times \text{perpendicular}$$

$$= \frac{1}{2} bp$$



c. Area of equilateral triangle

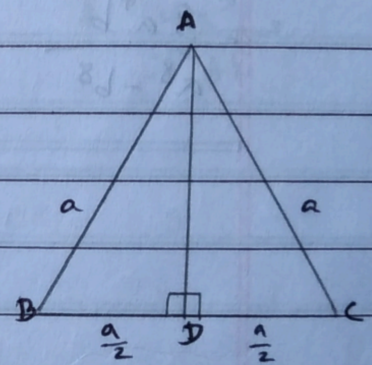
In right∠Δ ABD, $AD = \sqrt{AB^2 - BD^2}$

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

$$= \sqrt{a^2 - a^2/4}$$

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

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



d. Area of isosceles triangle

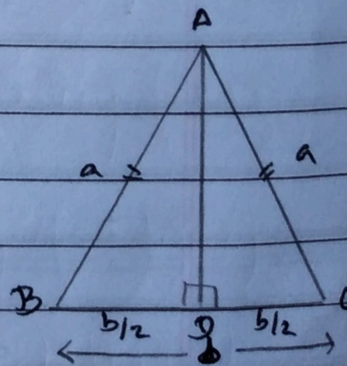
~~In ⊥Δ~~ In ⊥Δ ABD, $AD = \sqrt{AB^2 - BD^2}$

$$= \sqrt{a^2 - \frac{b^2}{4}}$$

$$= \sqrt{\frac{4a^2 - b^2}{4}}$$

$$= \frac{1\sqrt{4a^2 - b^2}}{2}$$

$$= \frac{1}{4} b \sqrt{4a^2 - b^2}$$



Exercise - 5.1

General Section

1.a. If the base and height of triangle are x and y cm respectively, find its area.

Solution:

Base (b) = x cm

height (h) = y cm

Now, Area (A) = $\frac{1}{2}bh$

$= \frac{1}{2}xy \text{ cm}^2$

b. If the base and perpendicular of a right angled triangle are a cm and b cm respectively, find its area.

Solution:

Base (b) = a cm

~~Height~~ Perpendicular (P) = b cm

Now, Area (A) = $\frac{1}{2}bp$

$= \frac{1}{2}ab \text{ cm}^2$

c. The length of each of two equal sides of equilateral triangle is P cm ~~and b cm respectively~~, find its area.

Solution:

Length (L) = P cm

We know,

Area (A) = $\frac{\sqrt{3}}{4}a^2$

$= \frac{\sqrt{3}}{4}P^2 \text{ cm}^2$

nlw

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d. The length of each of two equal sides of an isosceles triangle is is x cm and the base is y cm, find its area.

Solution:

Length of side (a) = x cm

Length of base (b) = y cm

we know,

$$\text{Area } (A) = \frac{1}{4} b \sqrt{4a^2 - b^2}$$

$$= \frac{1}{4} y \sqrt{4x^2 - y^2} \text{ cm}^2$$

---

e. If the length of three sides of a triangle are p cm, q cm and r cm respectively, find its area.

Solution:

Length of three sides = p cm, q cm and r cm

semi-perimeter (a) = $\frac{p+q+r}{2}$

we know,

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

$$= \sqrt{\left(\frac{p+q+r}{2}\right)\left(\frac{p+q+r}{2} - p\right)\left(\frac{p+q+r}{2} - q\right)\left(\frac{p+q+r}{2} - r\right)}$$

$$= \sqrt{\left(\frac{p+q+r}{2}\right)\left(\frac{p+q+r-2p}{2}\right)\left(\frac{p+q+r-2q}{2}\right)\left(\frac{p+q+r-2r}{2}\right)}$$

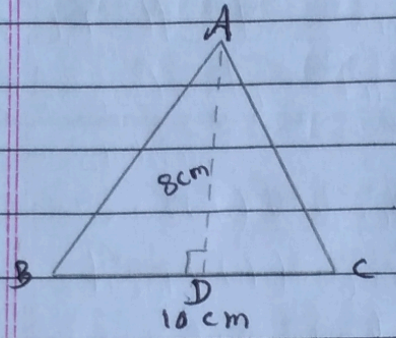
$$= \sqrt{\left(\frac{p+q+r}{2}\right)\left(\frac{q+r-p}{2}\right)\left(\frac{p-q+r}{2}\right)\left(\frac{p+q-r}{2}\right)}$$

$$= \frac{1}{4}\sqrt{(p+q+r)(q+r-p)(p-q+r)(p+q-r)}$$

---

3. Find the area of the following figures.

a.



Solution:

Height (h) = 8 cm

Base (b) = 10 cm

We know,

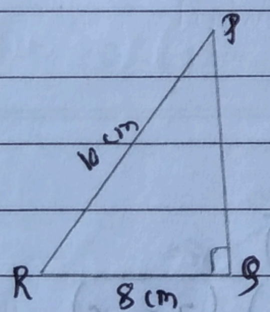
$$\text{Area}(a) = \frac{1}{2} bh$$

$$= \frac{1}{2} \times 8 \times 10$$

$$= 40 \text{ cm}^2$$

---

b.



Solution:

Here, Base (b) = 8 cm

Hypoteneuse (h) = 10 cm

$$\text{Perpendicular}(p) = \sqrt{h^2 - b^2}$$

$$= \sqrt{\cancel{8}10^2 - 8^2}$$

$$= \sqrt{36}$$

$$= 6 \text{ cm}$$

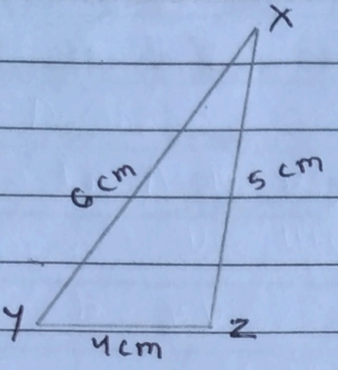
We know

$$\text{Area of triangle PQR} = \frac{1}{2} bp$$

$= \frac{1}{2} \times 8 \times 6$

$= 24 \text{ cm}^2$

c.



Here,

$a = 4\text{cm}$

$b = 5\text{cm}$

$c = 6\text{ cm}$

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

$= \frac{4+5+6}{2}$

$= 7.5\text{ cm}$

Also,

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

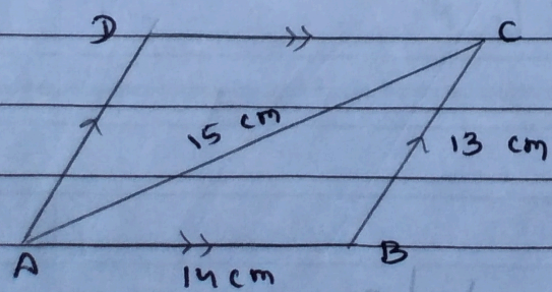
$= \sqrt{7.5(7.5-4)(7.5-5)(7.5-6)}$

$= \sqrt{7.5 \times 3.5 \times 2.5 \times 1.5}$

$= \sqrt{98.4375}$

$= 3.75\sqrt{7}\text{ cm}^2$

d



Solution:

In $\triangle ABC$,

$a = BC = 13\text{ cm}$

$b = AC = 15\text{ cm}$

$c = AB = 14\text{ cm}$

Now,

$S = \frac{a+b+c}{2} = \frac{13+14+15}{2} = 21\text{ cm}$

Now,

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

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

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

$= \sqrt{7056}$

$= 84\text{ cm}^2$

Also,

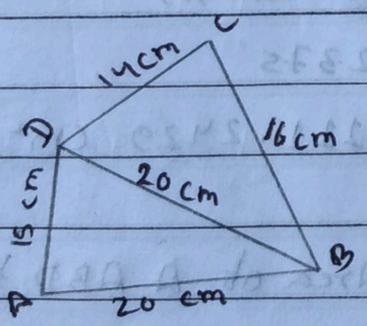
$\text{Area of parallelogram } ABCD = 2 \times \text{area of } \triangle ABC$

$= 2 \times 84\text{ cm}^2$

$= 168\text{ cm}^2$

---

e.



Solution:

In $\triangle ABD$,

$a = BD = 20\text{ cm}$

$b = AD = 15\text{ cm}$

$c = AB = 20\text{ cm}$

Now, $S = \frac{a+b+c}{2} = \frac{55}{2} = 27.5$

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

$= \sqrt{27.5\,(27.5-20)\,(27.5-15)\,(27.5-20)}$

$= \sqrt{27.5 \times 7.5 \times 12.5 \times 7.5}$

$= \sqrt{19335.9375}$

$= 139.05\ cm^2$

Again,

In Δ BCD,

a = DC = 14cm

b = BD = 20 cm

c = BC = 16 cm

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

$= \frac{14+20+16}{2}$

$= 25$

Again,

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

$= \sqrt{25\,(25-14)\,(25-20)\,(25-16)}$

$= \sqrt{25 \times 11 \times 5 \times 9}$

$= \sqrt{12375}$

$= 111.2429\ cm^2$

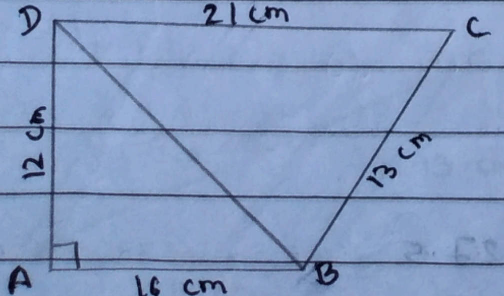
Now,

Area of the given figure = Area of Δ ABD + Area of Δ BCD

$= 139.05 + 111.2429$

$= 250.29\ cm^2$

f.



In right angled triangle ABD

Perpendicular (p) = 12 cm

Base (b) = 16 cm

hypotenuse (h) = ?

we know,

$$h = \sqrt{p^2 + b^2}$$

$$= \sqrt{(12)^2 + (16)^2}$$

$$= \sqrt{144 + 256}$$

$$= \sqrt{400}$$

$$= 20 \text{ cm}$$

Also, h = BD = 20 cm

Area of Δ ABD is,

$$\text{Area}(a) = \frac{1}{2} bp$$

$$= \frac{1}{2} \times 16 \times 12$$

$$= 96 \text{ cm}^2$$

Now,

In triangle BCD

a = CD = 21 cm

b = BD = 20 cm

c = BC = 13 cm

$$s = \frac{a+b+c}{2} = \frac{21+20+13}{2}$$

$$= 27 \text{ cm}$$

Again,

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

$$= \sqrt{27(27-21)(27-20)(27-13)}$$

$$= \sqrt{27 \times 6 \times 7 \times 14}$$

$$= \sqrt{15876}$$

$$= 126 \text{ cm}^2$$

At last,

$$\text{Area of given figure} = \text{Area of } (\Delta ABD + \Delta BCD)$$

$$= 96 \text{ cm}^2 + 126 \text{ cm}^2$$

$$= 222 \text{ cm}^2$$

4.a. Find the area of an equilateral triangle of each side 12 cm.

Solution:

Length of side (a) = 12 cm

Now, Area of equilateral triangle (A) = $\frac{\sqrt{3}}{4} a^2$

$= \frac{\sqrt{3}}{4} \times (12)^2$

$= \frac{\sqrt{3}}{\cancel{4}} \times \cancel{144}\,36$

$= 36\sqrt{3}$ cm²

b. Each of two equal sides of an isosceles triangle is 6 cm and base is 4 cm. Find its area.

Solution:

Side of isosceles triangle (a) = 6 cm

Base (b) = 4 cm

Area (A) = ?

We know, Area of isosceles Δ = $\frac{1}{4} b \sqrt{4a^2 - b^2}$

$= \frac{1}{\cancel{4}} \times \cancel{4} \sqrt{4 \times 6^2 - 4^2}$

$= \sqrt{4 \times 36 - 16}$

$= \sqrt{128}$

$= 8\sqrt{2}$ cm²

c. If the area of an equilateral triangle is $25\sqrt{3}$ cm². Find the length of its side.

Solution:

Area of equilateral triangle (A) = $25\sqrt{3}$ cm²

Length of side (a) = ?

we know, Area $= \frac{\sqrt{3}}{4} a^2$

or, $25\sqrt{3} = \frac{\sqrt{3}}{4} a^2$

or, $25\sqrt{3} \times 4 = \sqrt{3} a^2$

or, $\frac{25\cancel{\sqrt{3}} \times 4}{\cancel{\sqrt{3}}} = a^2$

or, $100 = a^2$

or, $a = \sqrt{100}$

$\therefore a = 10$ cm

$\therefore$ The length of its side is 10cm.

d. If the ~~equital~~ perimeter of equilateral triangle is 12 cm. Find its area.

Solution:

Perimeter of equilateral triangle (P) = 12 cm

or, $3a = 12$

or, $a = \frac{12}{3}$

$\therefore a = 4$ cm

$\therefore$ Length of side (a) = 4 cm

Now,

Area of equilateral triangle (A) $= \frac{\sqrt{3}}{4} a^2$

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

$= 4\sqrt{3}$ cm^2

e. The area of an isosceles triangle is 240 cm². If the base of the triangle is 20 cm. Find the length of its sides.

Solution:

Area of isosceles triangle (A) = 240 cm^2

Base (b) = 20 cm

Length of side (a) = ?

we know,

Area of isosceles triangle $= \frac{1}{4} b \sqrt{4a^2 - b^2}$

or, $240 = \frac{1}{\cancel{4}} \times \cancel{20}^{5} \sqrt{4 \times a^2 - (20)^2}$

or, $240 = 5\sqrt{4a^2 - 400}$

or, $48 = \sqrt{4a^2 - 400}$

S.b.s

$(48)^2 = \left(\sqrt{4a^2 - 400}\right)^2$

or, $2304 = 4a^2 - 400$

or, $2704 = 4a^2$

or, $a^2 = 676$

or, $a = \sqrt{676}$

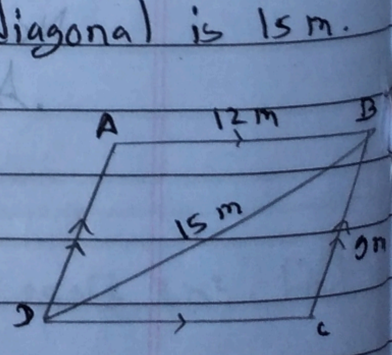
$\therefore a = 26$ cm

$\therefore$ The length of side is 26 cm.

Creative Section

5.a The shape of a piece of land is a parallelogram whose adjacent sides are 12 m and 9 m and the corresponding diagonal is 15 m. Find the area of land.

Solution:



Here,

In Δ ABD

AB = 12 m = a

AD = 9 m = b

BD = 15 m = c

Now,

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

$$= \frac{15+9+12}{2}$$

$= 18$ cm

Also,

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

$= \sqrt{18(18-12)(18-9)(18-15)}$

$= \sqrt{18 \times 6 \times 9 \times 3}$

$= \sqrt{2916}$

$= 54 \text{ cm}^2$

Here,

The area of land $= 2 \times$ Area of triangle ABD

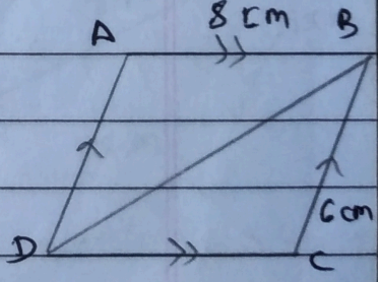
$= 2 \times 54$

$= 108 \text{ m}^2$

---

b. Two adjacent sides of a parallelogram are 8 cm and 6 cm and its area is 48 cm². Find the length of its diagonal.

Solution:



Here, In Δ ABD

AB = a = 8 cm

AD = b = 6 cm

BD = C = ?

Area of Parallelogram ABCD = 48 cm²

Let the third side BD (c) be 'x'.

We know,

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

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

$= (14+x)/2$

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From Δ ABD

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

or, $24 = \sqrt{\left(\frac{14+x}{2}\right)\left(\frac{14+x}{2} - 8\right)\left(\frac{14+x}{2} - 6\right)\left(\frac{14+x}{2} - x\right)}$

or, $24 = \sqrt{\left(\frac{14+x}{2}\right)\left(\frac{14+x-16}{2}\right)\left(\frac{14+x-12}{2}\right)\left(\frac{14+x-2x}{2}\right)}$

or, $24 = \sqrt{\left(\frac{14+x}{2}\right)\left(\frac{x-2}{2}\right)\left(\frac{x+2}{2}\right)\left(\frac{14-x}{2}\right)}$

or, $24 = \sqrt{\frac{(14+x)(14-x)(x-2)(x+2)}{16}}$

or, $24 \times 4 = \sqrt{(14)^2 - (x)^2 \; (x^2 - 2^2)}$

or, $96 = \sqrt{(196 - x^2)(x^2 - 4)}$

or, $96 = \sqrt{196x^2 \cancel{- 4x^2} - x^4 + 4x^2 - 784}$

or, $96 = \sqrt{200x^2 - 784 - x^4}$

S.b.s

$9216 = 200x^2 - 784 - x^4$

or, $9216 + 784 - 200x^2 + x^4 = 0$

or, $x^4 - 200x^2 + 10000 = 0$

or, $x^4 - (100+100)x^2 + 10000 = 0$

or, $x^4 - 100x^2 - 100x^2 + 10000 = 0$

or, $x^2(x^2 - 100) - 100(x^2 - 100) = 0$

or, $(x^2 - 100)(x^2 - 100) = 0$

So,

$x^2 - 100 = 0$

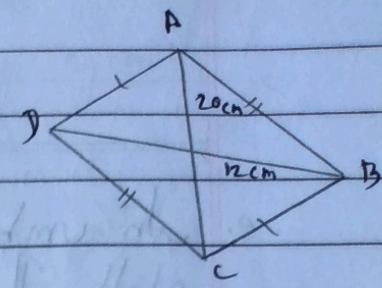
or, $x^2 = 100$

or, $x = \sqrt{100}$

$\therefore x = 10$ cm

$\therefore$ The length of its diagonal is 20 cm.

c. A rhombus-shaped piece of land has diagonals 20 cm and 12 cm. find the area of the land.



Solution:

~~Diameter~~ 1st diagonal $(d_1) = 20$ cm

Second diagonal $(d_2) = 12$ cm

Area (A) = ?

We know,

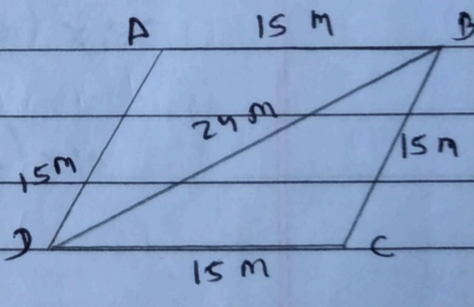
$$\text{Area (A)} = \frac{1}{2} d_1 \times d_2$$

$$= \frac{1}{\cancel{2}} \times 20 \times \cancel{12}^{6}$$

$$= 120 \text{ cm}^2$$

$\therefore$ The area of the land is 120 cm^2.

d. A garden is in the shape of a rhombus whose ~~area~~ each side is 15 m and its one of the two diagonals is 24 m. find the area of the garden.



Solution.

Here,

Length of each sides of rhombus = ~~24cm~~ 15 m

length of diagonal = 24 m

Now,

from ~~triang~~ isosceles triangle CBD,

$$\text{Area (A)} = \frac{1}{4} b\sqrt{4a^2 - b^2}$$

$$= \frac{1}{\cancel{4}} \times 24 \sqrt{4 \times (15)^2 - (24)^2}$$

$$= 6\sqrt{\cancel{900 - 6}\ 900 - 576}$$

$$= 6\sqrt{324}$$

$$= 6 \times 18$$

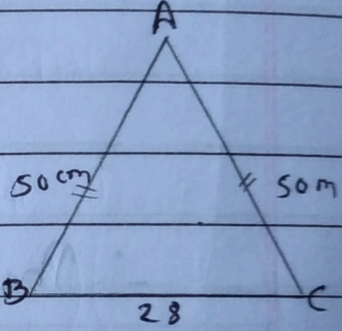
$$= 108 \text{ m}^2$$

Here, Area of garden (A) = 2 × Area of triangle CBD

= 2×108

= 216 cm^2

e. An umbrella is made up of 6 isosceles triangles pieces of cloth The measurement of the base of each triangle is 28 cm and two equal sides are 50 cm each. If the rate of cloth is Rs 0.50 per cm^2. Find the cost of cloth required for making umbrella.



Solution:

Base of triangle (b) = 28 cm

Side of isosceles triangle (a) = 50 cm

Area (A) = ?

we know,

$$\text{Area (A)} = \frac{1}{4} b\sqrt{4a^2-b^2}$$

$$= \frac{1}{4} \times 28 \sqrt{4\times(50)^2-(28)^2}$$

$$= 7\sqrt{10000-784}$$

$$= 7\sqrt{9216}$$

$$= 7\times 96$$

$$= 672 \text{ cm}^2$$

Also,

Area of umbrella = 6 × 672

= 4032 cm^2

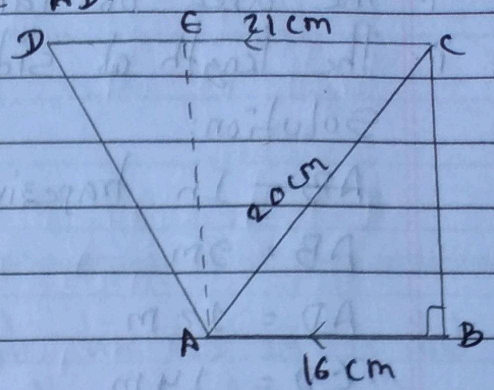
Also,

Cost of cloth required = 4032 × 0.50

= Rs 2016

6.a. The adjoining figure is a trapezium ABCD. find

i. its area   ii. Length of side BC and AD.



Solution:

In right angled Δ ABC

$AB = b = 16$ cm

$AC = h = 20$ cm

$BC = p = ?$

We know,

$$h = \sqrt{p^2 + b^2}$$

$$\text{or, } 20 = \sqrt{(BC)^2 + (16)^2}$$

$$\text{or, } 20 = \sqrt{(BC)^2 + 256}$$

s.b.s

$$\text{or, } 400 = (BC)^2 + 256$$

$$\text{or, } BC = \sqrt{400 - 256}$$

$$\therefore BC = 12 \text{ cm}$$

Now,

$$\text{Area of trapezium, ABCD} = \frac{1}{2}(AB + CD) \times BC$$

$$= \frac{1}{2}(21 + 16) \times 12$$

$$= 222 \text{ cm}^2$$

Again,

AE is drawn perpendicular to CD. So, ABCE is a Parallelogram.

In right angled triangle, AED

$AE = 12$ cm

$DE = 5$ cm

$AD = ?$

$$\text{we know, } (AD)^2 = (AE)^2 + (DE)^2$$

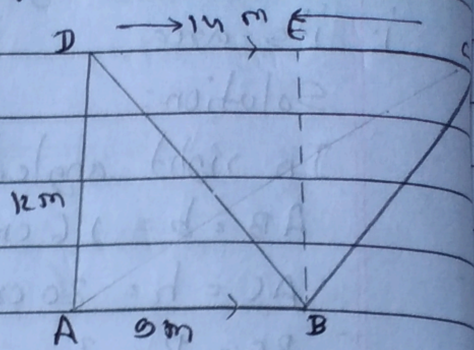
$$\text{or, } AD = \sqrt{(12)^2 + (5)^2}$$

$$\therefore AD = 13 \text{ cm}$$

b. In the figure alongside, ABCD is a piece of land. Find

i. the area of land

ii. The length of side BD and BC.



Solution:

~~AB =~~ In trapezium, ABCD

AB = 9m

AD = 12 m

CD = 14 m

Now,

(i) Area of trapezium, ABCD $= \frac{1}{2}(CD + AB) \times AD$

$= \frac{1}{2}(14 + 9) \times 12$

$= 138\ m^2$

Again,

BE is drawn perpendicular to CD; So, ABDE is a parallelogram.

(ii) In right angled triangle, CBE

BE = 12m

CE = 5 m

BC = ?

We know,

$BC = \sqrt{(BE)^2 + (CE)^2}$

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

$= \sqrt{144 + 25}$

$= 13$ cm

Again,

In right angled triangle, ABD

AB = 9 m

AD = 12 m

BD = ?

we know,

$$BD = \sqrt{(AD)^2 + (AB)^2}$$
$$= \sqrt{(12)^2 + 9^2}$$
$$= \sqrt{144 + 81}$$
$$= 15 \text{ m}$$

7.a. If the ratio of the sides of a triangle are 13 : 14 : 15 and its Perimeter is 84 cm, find the area of the triangle.

Solution:

Let $13x$, $14x$, and $15x$ be the sides of triangle whose perimeter is 84 cm.

we know,

Perimeter = Sum of sides

or, $84 = 13x + 14x + 15x$

or, $84 = 42x$

or, $x = \frac{84}{42}$

$\therefore x = 2$ cm

Now,

first side (a) = $13x$ = 26 cm

second side (b) = $14x$ = 28 cm

Third side (c) = $15x$ = 30 cm

Also,

Semi-perimeter (s) = $(a+b+c)/2$

$= (26+28+30)/2$

$= 42$ cm

Again,

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

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

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

$= 336 \text{ cm}^2$

b. The perimeter of a triangle is 84 cm and its area is 336 cm^2. If one of the length of its side is 30 cm, find the length of other sides.

Solution:

Let the unknown side of triangle be a and b.

Here, perimeter (p) = 84cm

Semi-perimeter (s) = $\frac{84}{2}$ = 42cm

we, know,

$a + b + c = 84$

or $a + b = 84 - c$

or $a + b = 84 - 30$

$\therefore b = 54 - a$

Now,

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

or, $336 = \sqrt{42(42-a)(42-54+a)(42-30)}$

or, $336 = \sqrt{42(42-a)(a-12)12}$

S.b.s

or $112896 = 42 \times 12 (42-a)(a-12)$

or $112896 = 504 (42a - 504 - a^2 + 12a)$

or $\frac{112896}{504} = 42a - 504 - a^2 + 12a$

or $a^2 - \cancel{12a}\, 54a + 504 = -224$

or $a^2 - 54a + 504 = 0 - 224$

or, $a^2 - 54a + 728 = 0$

or $a^2 - (26+28)a + 728 = 0$

or, $a^2 - 26a - 28a + 728 = 0$

or, $a(a-26) - 28(a-26) = 0$

or, $(a-26)(a-28) = 0$

Either $a - 26 = 0$ OR $a - 28 = 0$

$\therefore a = 26$ or $a = 28$

When,

$a = 26$ $a = 28$

$b = 54 - 26$ $b = 54 - 28$

$= 28$ $\therefore b = 26$

---

c. The perimeter of a trianglular garden is 18 m. ~~and~~ If its area is $\sqrt{135}\ m^2$ and one of the three side is 8m, find the remaining two sides.

Solution:

Given, Perimeter of trianglular garden = 18 m

Semi-perimeter(s) $= \frac{18}{2} = 9m$

Area(A) $= \sqrt{135}\ m^2$

Let the unknown sides be 'b' and 'c'

we know,

$a + b + c = 18$

or, $8 + b + c = 18$

or, $b = 18 - 8 - c$

$\therefore b = 10 - c$

Also,

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

or, $\sqrt{135} = \sqrt{9(9-8)(9-10+c)(9-c)}$

or, $135 = 9 \times 1 (c-1)(9-c)$

or, $\frac{135}{9} = 9c - c^2 - 9 + c$

or, $15 = 10c - c^2 - 9$

or, $c^2 - 10c + 24 = 0$

or, $c^2 - (6+4)c + 24 = 0$

or, $c^2 - 6c - 4c + 24 = 0$

or, $c(c-6) - 4(c-6) = 0$

or $(c-6)(c-4)=0$

Either OR

$c-6=0$ $c-4=0$

$\therefore c=6$ $\therefore c=4$

When,

$c=6$ $c=4$

$b=10-c$ $b=10-c$

$=10-6$ $=10-4$

$=4m$ $=6m$

---

d. The perimeter of right angled triangle is 24 cm and its area is $24cm^2$. Find the sides of the triangle.

Solution:

Perimeter of right angled triangle (P) = 24cm

Area (A) = $24 cm^2$

Let 'a' and 'b' be the side and 'c' be the hypotenuse.

we know,

$\frac{1}{2} ab = 24$

$\therefore ab = 48$ ——— (i)

Again,

$h^2 = p^2 + b^2$

or $c^2 = a^2 + b^2$

or, $c^2 = (a+b)^2 - 2ab$

or $c^2 = (24-c)^2 - 2 \times 48$

or $c^2 = (24-c)^2 - 96$

or $96 = (24-c)^2 - c^2$

or $96 = (24-c+c)(24-c-c)$

or $96 = 24(24-2c)$

or $96 = 576 - 48c$

or $48c = 576 - 96$

or, $c = \frac{480}{48}$

$\therefore c = 10$

Again,

$a+b = 24-c$

or, $a+b = 24-10$

$\therefore a+b = 14$ —— (ii)

Also,

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

or $c^2 = a^2+(14-a)^2$

or $(10)^2 = a^2-196-28a+a^2$

or $200 = 2a^2$

Again, we have

$(a-b)^2 = (a+b)^2 - 4ab$

$= (14)^2 - 4\times 48$

$= 196 - 192$

$\therefore a-b = \sqrt{4}$ —— (iii)

Now,

Adding equation (ii) and (iii)

$a+b+a-b = 14+2$

or, $2a = 16$

$a = 8$

putting the value of a in equation (ii)

$a+b = 14$

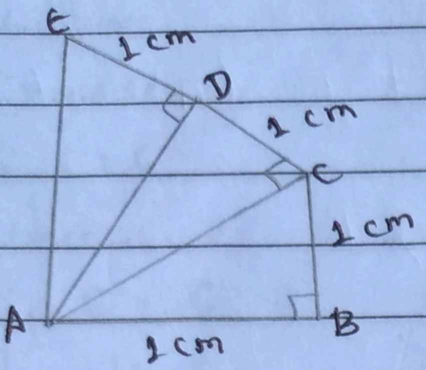
~~or 8+b=14~~ or, $8+b = 14$

~~$\therefore b=5$~~ $\therefore b = 6$ cm

So, the required side of triangle are, 8, 6 and 10 respectively.

8. Find the area of each of the following polygons.

a.



Solution:

In right angled triangle ABC

$h^2 = p^2 + b^2$

or $(AC)^2 = (AB)^2 + (BC)^2$

or $AC = \sqrt{1^2 + 1^2}$

$\therefore AC = \sqrt{2}$ cm

Again,

In right angled triangle, ACD

$h^2 = p^2 + b^2$

or $(AD)^2 = (AC)^2 + (CD)^2$

or $AD = \sqrt{(\sqrt{2})^2 + 1^2}$

$\therefore AD = \sqrt{3}$ cm

Also,

Area (A) = $\frac{1}{2}$ ~~bh~~ bp

$= \frac{1}{2} \times 1 \times \sqrt{2}$

$= \cancel{\frac{\sqrt{3}}{2} cm^2}$ $\frac{\sqrt{2}}{2}$ cm^2

Also,

Area of triangle, ABC

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

$= 0.5 \text{ cm}^2$

Again,

~~fro~~ for triangle, ADE

Area $= \frac{1}{2} bp$

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

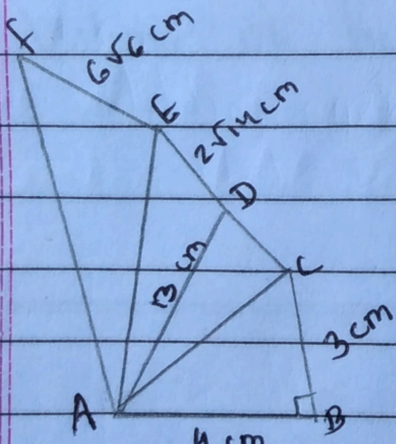
$= \frac{\sqrt{3}}{2}$

At last, total area of given polygon = Area of ΔABC + Area of triangle ACD + Area of Δ ADE

$= \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} + 0.5$

$= 2.07 \text{ cm}^2$

b.



Solution: