⇒MENSURATION (2-Dimensional)

Flat Shape/2-D figures

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1. Triangle
2. Polygon
3. Circle
4. Rectangle
5. Square
6. Rhombus
7. Trapezium

(4, 5, 6, 7) → Parallelogram ⇒ Quadrilateral

Rectangle →

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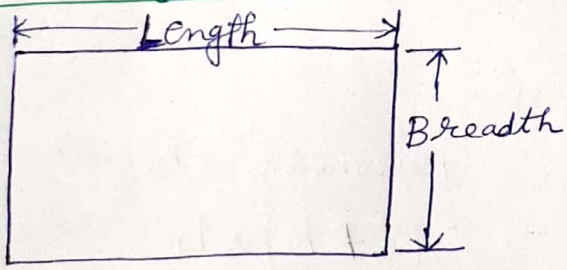

(1) Its diagonals are equal & bisect each other
(2) Area = Length × Breadth
(3) Perimeter = 2 (Length + Breadth)
(4) Diagonal ⇒ $(d) = \sqrt{l^2 + b^2}$
(5) Area of path inside a rectangle ⇒

Area of path = $2x(l + b - 2x)$

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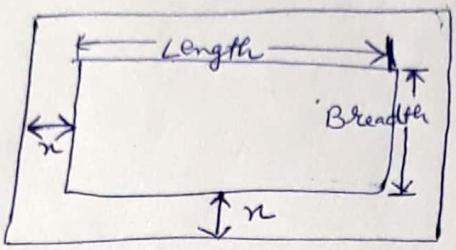
6) Area of path outside a rectangular field

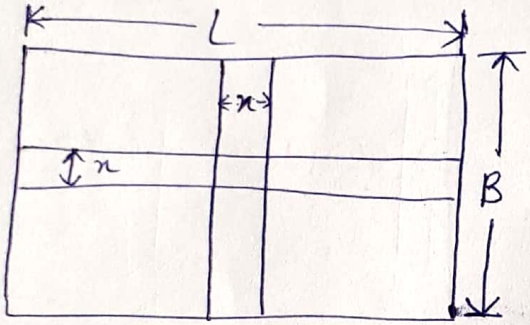
Area of path $= 2x(l+b+2x)$



Perimeter $= 2(l+b) + 2(l+b+4x)$

$= 4(l+b+2x)$

7)



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Area of path midway $= x(l+b-x)$

Perimeter of path $(P) = 2(l+b) - 4x$

$= 2(l+b-2x)$

8) Room as Rectangular figure

Area of four walls of Room = perimeter × height

$= 2(l+b) \times h$

9) Area of Roof and 4 walls $= 2H(L+B) + LB$

(this formula is used when Question related to Paint whole Room is asked).

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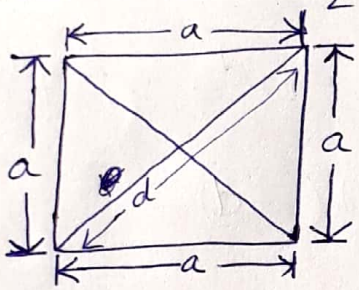
Square

* Every square is a Rhombus but every Rhombus is not a Square.

1) Diagonals are equal & bisect each other at 90°

2) Area $= a^2 = \frac{1}{2} \times (\text{diagonal})^2$



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3) perimeter $= 4a$

4) diagonal $(d) = \sqrt{2}\, a$

5) In circle Radius $= \frac{\text{Side}}{2}$

6) Circum circle Radius $= \frac{\text{Side}}{\sqrt{2}}$

7) area of path inside square $= 4d(x-d)$

$\therefore d$ = length of path

x = length of square.

8) area of path outside square $= 4d(x+d)$

9) area of path midway square $= d(2x-d)$

10) If the area of the square is a cm^2, then the area of the circle formed by the same perimeter is

$\Rightarrow \frac{4a}{\pi}\ cm^2$

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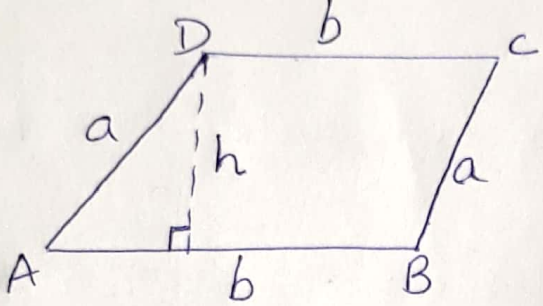
Parallelogram → If opposite sides of a quadrilateral are parallel, it is called parallelogram.

Its opposite sides are also equal in length.



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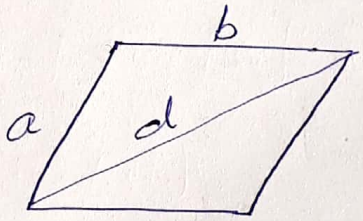
1) area → base x height ⇒ $b \times h$

2) Perimeter = $2(a+b)$

3) $d_1^2 + d_2^2 = 2(a^2+b^2)$ (where d_1, d_2 = lengths of diagonal)

4) Area = $A = 2\sqrt{s(s-a)(s-b)(s-d)}$

$$\boxed{s = \frac{a+b+d}{2}}$$



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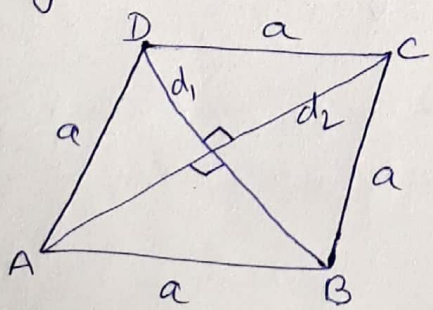
where a, b are adjacent sides, d is the length of diagonals

⇒ Rhombus

It is a Quadrilateral whose all four sides are equal. Diagonal bisect each other at 90°.



1) Diagonals bisect each other at 90°

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

3) $a = \frac{1}{2}\sqrt{d_1^2 + d_2^2}$

4) $P = 4a$

5) $d_1^2 + d_2^2 = 4a^2$

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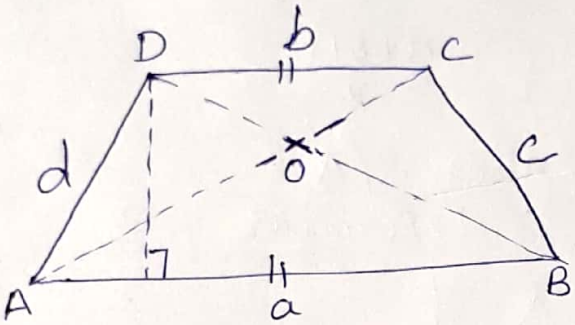
⇒ Trapezium →

It is a quadrilateral whose any two opposite sides are parallel.



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1) Perimeter = $a+b+c+d$

2) Area = $\frac{1}{2}$ (Sum of parallel sides) × distance b/w them

$\Rightarrow \frac{1}{2}(a+b) \times h$

3) $d_1^2 + d_2^2 = c^2 + d^2 + 2(ab)$

4) If diagonal Intersect at O, than

$$\frac{AO}{OC} = \frac{BO}{OD} = \frac{AB}{DC}$$

$[\because \Delta AOB \sim \Delta COD]$

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⇒ Triangle →

A triangle is a polygon with three sides/edges & three vertices. It is one of the basic shapes in Geometry. It denoted by ΔABC.

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Type of triangles

1) Scalene Triangle →

A scalene triangle has all its sides of different lengths.
Equivalently, it has all angles of different.

(i) Area = $\frac{1}{2}$ × Base × height

(ii) Area = $\sqrt{s(s-a)(s-b)(s-c)}$ [Hero's formula]

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

(iv) In circle Radius = $\frac{\text{Area of } \Delta}{\text{Semi-perimeter}}$

$$\boxed{r = \frac{\Delta}{s}}$$

(v) Circum circle Radius = $\frac{abc}{4 \times \text{area of } \Delta}$

[a, b, c = sides of triangle]

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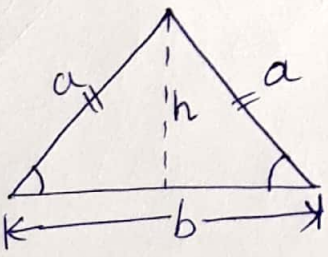
2. Isosceles triangle →

An Isosceles triangle is a triangle with two equal sides also their opposite angles are equal.



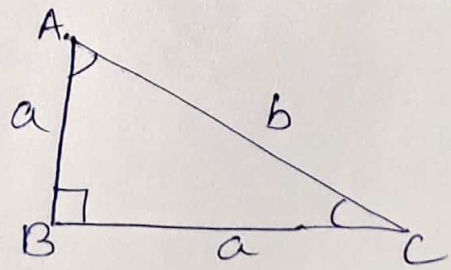
(i) Area = $\frac{b}{4}\sqrt{4a^2-b^2}$

(ii) Perimeter = $2a+b$

(iii) h (Altitude) = $\frac{\sqrt{4a^2-b^2}}{2}$

(iv) Area = $\frac{1}{2}a^2$ (If right angle Δ)

(v) $h = a\sqrt{2}$ (By Right angled triangle)



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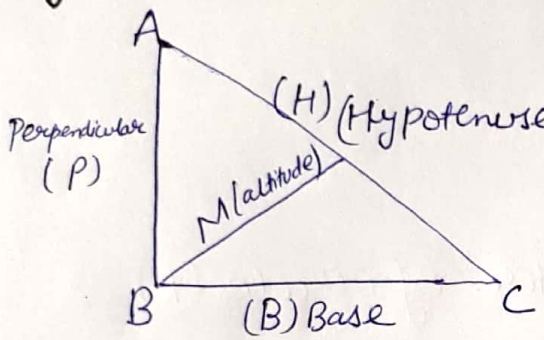
3) Right angle triangle →



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(i) Area $= \frac{1}{2} \times$ Base $\times$ Height

(ii) perimeter $= P+B+H$

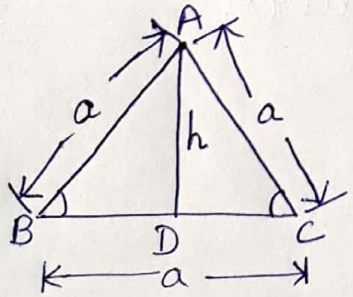
(iii) Altitude $(M) = \frac{P \times B}{H}$

(iv) $H^2 = P^2 + B^2$

(v) In radius $(r) = \frac{P+B-H}{2}$

(vi) Circum radius $(R) = H/2$

4) Equilateral triangle →



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

(ii) perimeter $(2s) = 3a$

(iii) Altitude $(h) = \frac{\sqrt{3}}{2} a$

(iv) Incircle Radius $(r) = \frac{a}{2\sqrt{3}}$

(v) Circumcircle Radius $(R) = \frac{a}{\sqrt{3}}$

(vi) $\angle A = \angle B = \angle C = 60°$

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

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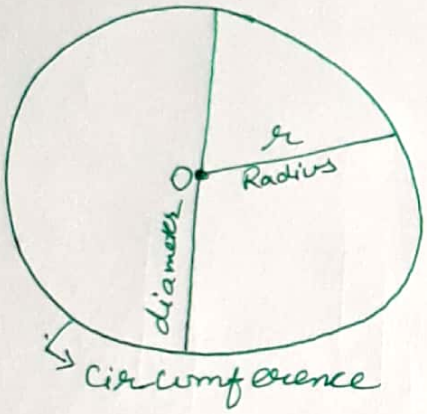
⇒ Circle



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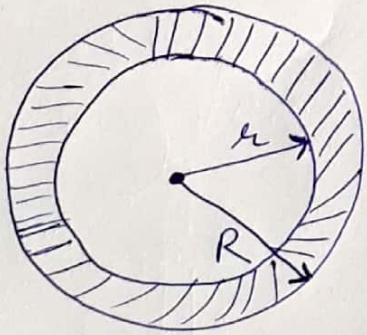
(i) Circumference or perimeter of Circle (P) =

$$\Rightarrow 2\pi r = \pi d$$

(ii) Area $= A = \pi r^2 = \frac{\pi d^2}{4}$

diameter of the circle $= d = \sqrt{\frac{4A}{\pi}}$

Ring or circular path →



R = Outer Radius
r = inner radius

(i) Area $(A) = \pi (R^2 - r^2)$

(ii) perimeter $= 2\pi (R + r)$

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3D (Three Dimensional)

A three dimensional shape is a solid shape that has height & depth. For example – sphere, cube, etc.

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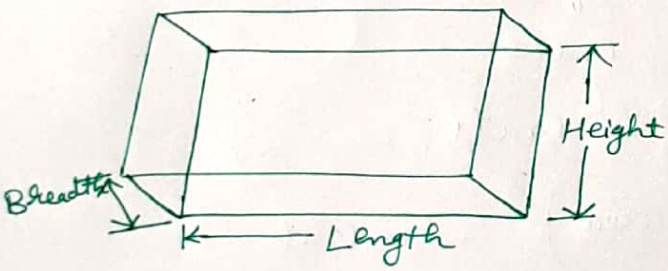
⇒ Cuboid



① Volume = $l \times b \times h$ cubic unit

or

Volume = $\sqrt{A_1 \times A_2 \times A_3}$ cubic unit

$$\begin{bmatrix} A_1 = lb \\ A_2 = bh \\ A_3 = hl \end{bmatrix}$$

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② Lateral Surface area / Curved surface area / area of four wall

= Perimeter of Base × height

= $2(l+b) \times h$ Sq. units

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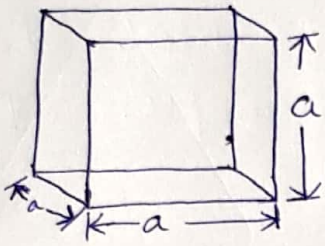
(3) Total surface area = $2(lb + bh + hl)$ sq. unit

(4) Diagonal of cuboid = $\sqrt{l^2 + b^2 + h^2}$ units

⇒ Cube



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(1) Volume = a^3 cubic units

(2) Lateral Surface area = $4a^2$ sq. unit

(3) Total Surface area = $6a^2$ sq. units

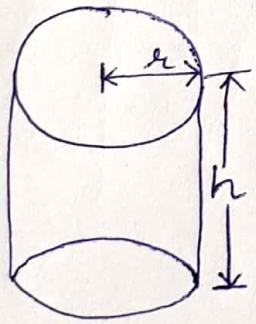
(4) Diagonal of cube (d) = $\sqrt{3}\,a$ units

(5) Face of diagonal of cube = $\sqrt{2}\,a$ units

(6) Volume of cube = $\left(\sqrt{\frac{\text{Surface area}}{6}}\right)^3$ cubic unit

→ Right circular Cylinder

→ Solid cylinder



Volume = $\pi r^2 h$

Curved Surface area = $2\pi rh$

Total Surface area = $2\pi rh + 2\pi r^2$

$\Rightarrow 2\pi r(r+h$

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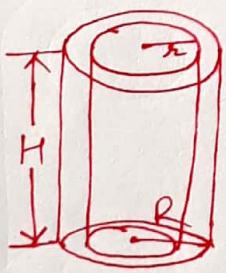

r = Internal radius of Base

R = External radius of Base

H = height

Volume = $\pi h(R^2 - r^2)$

C.S.A = $2\pi h(R+r)$

T.S.A = $2\pi h(R+r) + 2\pi(R^2 - r^2)$

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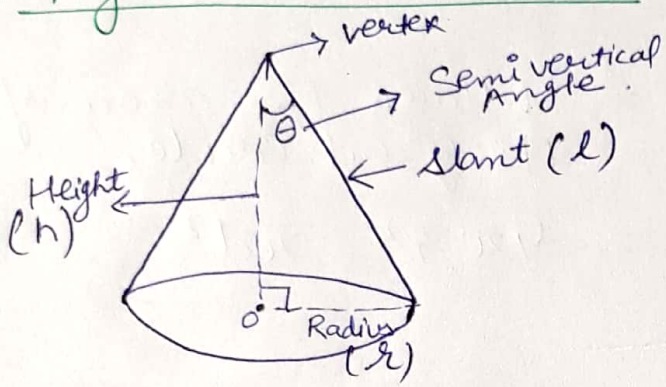
⇒ Right Circular Cone :⇒



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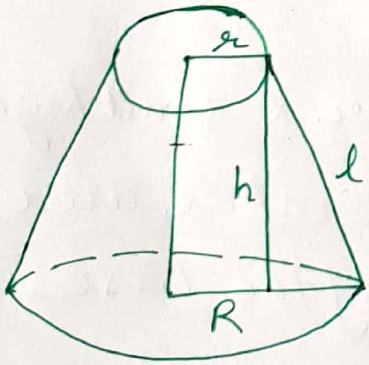
$$\text{Volume} = \frac{1}{3}\pi r^2 h$$

$$\text{Total Surface area} = \pi(r+l)\,r$$

$$\text{Lateral Surface area} = \pi r l$$

⇒ Frustum of a right circular cone :⇒



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$$\text{Slant height } (l) = \sqrt{h^2+(R-r)^2}$$

$$\text{Volume} = \frac{1}{3}\pi h\left(R^2+r^2+R.r\right)$$

$$\text{Lateral Surface Area} = \pi(R+r)\,l$$

$$\text{Total Surface area} = \pi\left[l(R+r)+R^2+r^2\right]$$

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→ Sphere

→ Volume $= \frac{4}{3}\pi r^3 = \frac{\pi}{6}d^3$

Where r = radius
d = diameter

→ Surface area of a sphere = 4 times the area of its great circle.

$= 4\pi r^2 = \pi d^2$

→ Hemisphere

→ Volume $= \frac{2}{3}\pi r^3$

→ Curved surface area $= 2\pi r^3$

→ Total surface area $= 2\pi r^2 + \pi r^2 = 3\pi r^2$

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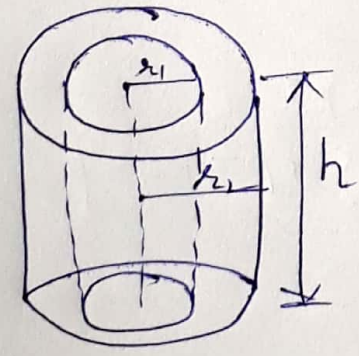
→ Pyramids

- Volume $= \frac{1}{3}$ x area of base x height
- Curved surface area $= \frac{1}{2}$ x perimeter x slant height
- Total surface area = Curved surface area + area of the base

→ Hollow Cylinder



$$\begin{cases} \text{Volume} = \pi(r_2^2 - r_1^2)h \\ \text{C.S.A} = 2\pi(r_1 + r_2)h \\ \text{T.S.A} = 2\pi(r_1 + r_2)[h + (r_2 - r_1)] \\ \text{Thickness}(t) = (r_2 - r_1) \end{cases}$$

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Important Questions / Examples →

Q1 If the diagonal of square measure 5.2 cm, then find the area of square?

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Sol^n

$$\text{Area} = \frac{(\text{Diagonal})^2}{2}$$

$$\text{Area} = \frac{5.2 \times 5.2}{2} = 13.52 \text{ cm}^2 \text{ (Answer)}$$

Q2 If diagonal of square A = a+b find the diagonal of square whose area is twice of area of square A.

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Sol^n

$$\text{Diagonal} = \sqrt{2} \times \text{side}$$

$$D = \sqrt{2}\,\text{side} \Rightarrow (a+b)$$

$$\text{area} = \frac{(a+b)^2}{2}$$

$$2\,\text{area} = (a+b)^2 \quad [\because \text{twice the area}]$$

$$\text{Diagonal} = \sqrt{2}\sqrt{(a+b)^2}$$

$$\boxed{\text{Diagonal} = \sqrt{2}\,(a+b)}$$

Answer

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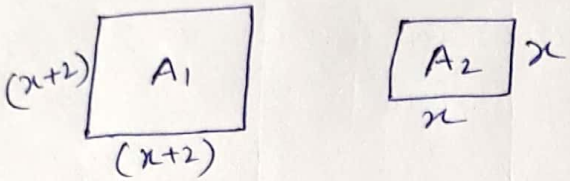
Q3 The difference of the area of two Square drawn on two line segments of different lengths is 32 Sq. cm. find the length of greater line segment If one is longer than other by 2 cm.

Soln



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$A_1 - A_2 = 32\ cm^2$

$(x+2)^2 - x^2 = 32$

$x^2 + 4 + 4x = 32 + x^2$

$4x = 28$

$x = 7$

length of greater line Segment $= x+2 = 7+2 = 9$

Q4 Diagonal of two Square are in Ratio 2:5 then their area will be in the Ratio of?

Soln

Side A : Side B

$A\sqrt{2} : B\sqrt{2}$

side 2 : 5

area 4 : 25 Answer.

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Q5 The perimeter of 5 Square are 24 cm, 32 cm, 40 cm, 76 cm, 80 cm. The perimeter of another Square equal in area to Sum of the area of these Squares is ÷?

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Sol^{n} $4a_1 = 24$, $a_1 = 6$, $a_1^2 = 36$

$a_2^2 = \left(\frac{34}{4}\right)^2 = (8)^2 = 64$

$a_3^2 = \left(\frac{40}{4}\right)^2 = 10^2 = 100$

$a_4^2 = \left(\frac{76}{4}\right)^2 = (19)^2 = 361$

$a_5 = \left(\frac{80}{4}\right)^2 = (20)^2$, $a_5 = 400$

Total area = $36 + 64 + 100 + 400 + 361 = 961$

Side = $\sqrt{961} = 31$

Perimeter of Sq. = $31 \times 4 \Rightarrow \underline{124}$ cm

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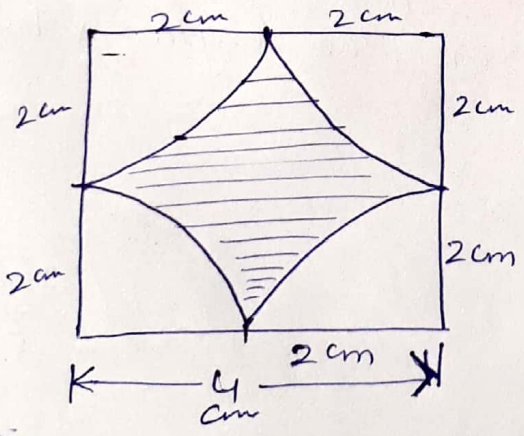
Q6 From a square sheet of side 4cm, four pieces each in shape of arc of a circle with radius 2cm each are cut out. find the area of the Remaining portion is ?

Sol^{n}



Area of Sq $\Rightarrow 16\,cm^2$

Area of circle $= \pi r^2 = \pi(2)^2 = 4\pi$

Area of Shaded portion $\Rightarrow (16 - 4\pi)$ sq. cm.

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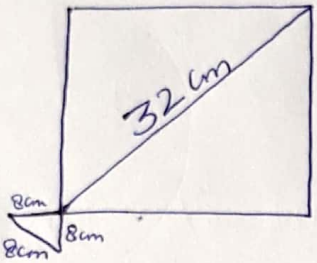
Q7 A kite in the shape of a square with a diagonal 32 cm attached to an equilibrium triangle of the base 8cm. Approximately how much paper has been used to make it. (use $\sqrt{3} = 1.732$)

Soln



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Area of eq. triangle $= \frac{\sqrt{3}}{4}(8)^2 = 16\sqrt{3}$ cm^2

Area of square $= \frac{\text{diagonal}^2}{2} = \frac{32 \times 32}{2} = (32 \times 16)$ cm^2

area of paper used $\Rightarrow 16(32 + \sqrt{3})$

$\Rightarrow 16(32 + 1.732)$

$\Rightarrow 16(33.732)$ cm^2

$\Rightarrow \underline{539.712 \text{ cm}^2}$

Q8 The breadth of a rectangular hall is $\frac{3}{4}$ of its length. If area of the floor is 768 Sq. m then the difference between the length & breadth of the hall is ?

Soln

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$b = \frac{3}{4}l$

area of floor $= l \times b$

$= \frac{3}{4} \times l \times l = 768$

$l^2 = \frac{768 \times 4}{3} = 256 \times 4$

$\boxed{l = 16 \times 2 = 32 \text{ m}}$

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Difference between length & Breadth

$b = \frac{3}{4} l$

$b = \frac{3}{4} \times 32 = 3 \times 8 = 24$

$l = 32$, $b = 24$

difference $\Rightarrow$ 8 m Answer.

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Q9 The length of a rectangular garden is 12 m & its breadth is 5m. find the length of diagonal of a sq. garden having the same area as that of the rectangular garden.

Soln

area of Rectangular garden = $12 \times 5 = 60\ m^2$

$A^2 = 60\ m^2$

Side of square = $(A) = \sqrt{60}$

Diagonal = $\sqrt{2}$ Side

$= \sqrt{2}\sqrt{60} = \sqrt{120} = 2\sqrt{30}$ m

Answer

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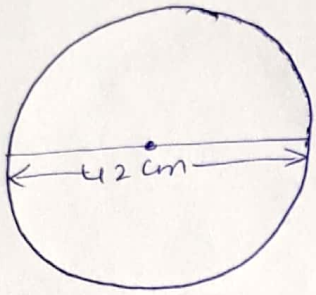
Q10 A circular wire of diameter 42 cm is folded in shape of a rectangular shape whose sides are in Ratio 6:5, then find the area enclosed by the rectangle.?

Soln



$D = 42\,cm$

$R = 21\,cm$

Perimeter $= 2\pi r$

$= 2 \times \frac{22}{7} \times 21$

$= 2 \times 22 \times 3 = 132\,cm$

Rectangle $= 2(6x + 5x) = 132\,cm$

$22x = 132$

$\boxed{x = 6\,cm}$

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$l = 6x = 6 \times 6 = 36\,cm$

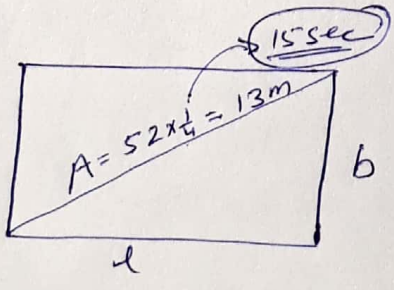
$b = 5x = 6 \times 5 = 30\,cm$

Area of rectangle $= 36 \times 30 \Rightarrow 1080\,cm^2$

Answer

Q11 A took 15 sec to cross a rectangular field diagonally walking at the Rate of 52 m/min & B took the same time to cross the same field along the sides walking at the Rate of 68 m/min. Then find the area of field.

Soln



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$l + b = \frac{68}{4} = 17m$

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$l^2+b^2 = 169$

$l^2+b^2+2lb = 289$

$2lb = 289 - 169 = 120$

$lb = \frac{120}{2} = 60\ m^2$

Area of field = $\underline{60\ m^2}$ Answer.

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Q12 There is a rectangular tank of length 180 m & b = 120m in a circular field. If the land area portion of the field is 40000 m^2. What is the Radius of field?

Soln

$l \times b = 180 \times 120 = 21600$

Total area = $40000 + 21600 = 61600$

$\pi r^2 = 61600\ m^2$

$\frac{22}{7} r^2 = 61600$

$r^2 = 2800 \times 7$

$\boxed{r = 140\ m}$ (Answer).

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Q13 ABC is a triangle with base AB. D is a point on AB such that AB = 5 & DB = 3. what is the ratio of the area of Δ ADC to the area of ΔABC

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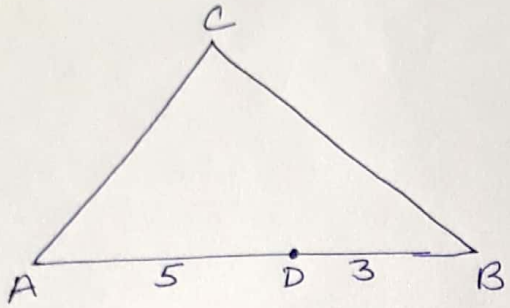
Sol^n



$\{AB : DB\}$
$\{5 : 3\}$

$$\frac{\text{area of } \triangle ADC}{\text{area of } \triangle ABC} = \frac{\frac{1}{2} \times AD \times H}{\frac{1}{2} \times AB \times H} = \frac{AD}{AB}$$

$$\Rightarrow \frac{2}{5} \Rightarrow [2:5]$$ Answer

Q14 If the area of triangle is 1176 cm^2 & Base : altitude = 3 : 4, then the altitude of triangle = ?

Sol^n $\triangle$ area = 1176

Corresponding altitude = H

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Base : H
3 : 4

$$\frac{1}{2} B H = \frac{1}{2} 3x \cdot 4x = 1176$$

$$6x^2 = 1176$$

$$x^2 = 196$$

$$\boxed{x = 14}$$

altitude of $\triangle = 4x = 4 \times 14$

$\Rightarrow$ 56 cm Answer

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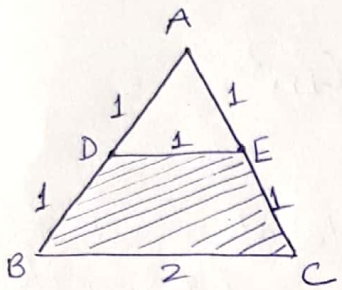
Q15 If D & E are the mid points of the side AB & AC respectively of Δ ABC in the fig given, here the shaded region of Δ is what % of whole triangle region ΔDEBC ?

Sol^n



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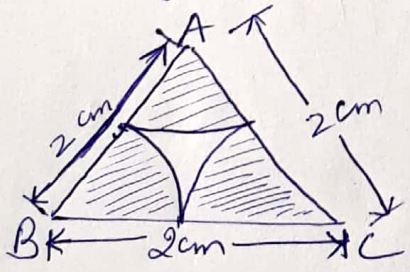
$\Delta ADE \sim \Delta ABC$

$$\frac{\text{area } \Delta ADE}{\text{area } \Delta ABC} = \frac{DE^2}{BC^2} = \frac{1}{4}$$

Shaded Region = $4 - 1 = 3$

% of Shaded Region = $\frac{3}{4} \times 100 = 75\%$

Q16 Area of an equilateral triangle of side 2cm In the given Δ ABC 3 arch of 1 cm Radius are drawn & shaded, find the shaded & unshaded area of the given triangle



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Sol^n area of $\triangle ABC = \frac{\sqrt{3}}{4}(2)^2 = \sqrt{3}\ cm^2$

area of arcs / Shaded Region area $\Rightarrow \frac{\pi r^2 \theta}{360^\circ}$ sq. unit

where r = radius of arch
θ = Combined angle of 3 arcs.

Shaded area $= \frac{\pi \times (60 \times 3)}{360} = \frac{\pi}{2}\ cm^2$

Unshaded area $= \left(\sqrt{3} - \frac{\pi}{2}\right) cm^2$

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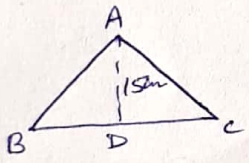
Q17 If the height of an equilateral triangle is 15 cm, then find the area of triangle?

Sol^n



$\{DC = a, BC = 2a\}$

$AD = 15\ cm$

$(15)^2 + a^2 = (2a)^2$

$3a^2 = 15^2$

$a^2 = 75$

$a = \sqrt{75} = 5\sqrt{3}$

$2a = 10\sqrt{3}$

$\triangle$ area $= \frac{\sqrt{3}}{4}(10\sqrt{3})^2 = \frac{\sqrt{3}}{4}(100 \times 3)$

$\Rightarrow 75\sqrt{3}\ cm^2$

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Q18 If the area of an equilateral triangle is $9\sqrt{3}\ m^2$, find the length of median = ?

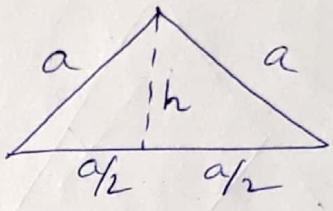
Sol^n

$$\frac{\sqrt{3}}{4}a^2 = 9\sqrt{3}$$

$$\sqrt{3}a^2 = 36\sqrt{3}$$

$$a^2 = 36$$

$$\boxed{a = 6}$$



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$$h^2 + \left(\frac{a}{2}\right)^2 = 36$$

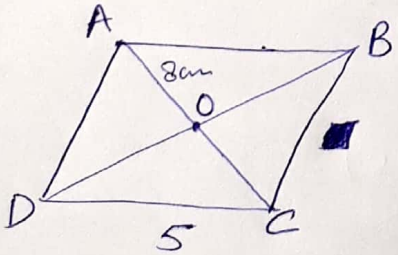
$$h^2 = 36 - 9$$

$$h^2 = 27$$

$$\boxed{h = 3\sqrt{3}}$$ Answer

Q19 The perimeter of non Square Rhombus is 20 cm. One of its diagonal is 8 cm. Find the area of the Rhombus is ?

Sol^n



Area of Rohmbus $= \frac{1}{2} d_1 d_2$

$d_1 = 8$

$AC = 8cm$

$OC = 4cm$

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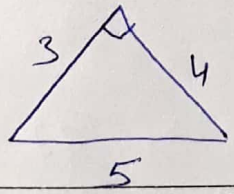
$$\boxed{d_2 = 3 \times 2 = 6}$$

Pythagorus triplet (3,4,5)



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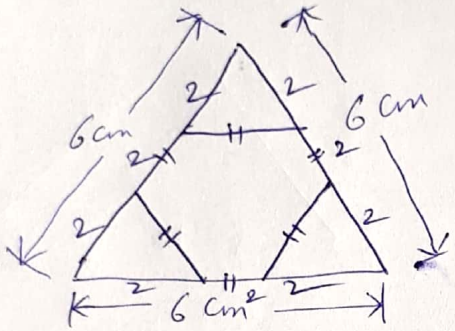
area of Rohmbus ⇒ 24 Sq. cm Answer.

$\because \left[\frac{1}{2} \times 6 \times 8\right] = \frac{24}{2}$

Q20 An equilateral triangle of side 6 cm has its corner cut off to form a regular hexagon. find the area of regular hexagon ?

Sol^n



$\frac{6}{3}$ = 2 cm each

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Area of Regular hexagon = $\frac{3\sqrt{3}}{2} \times (\text{Side})^2$

$\Rightarrow \frac{3\sqrt{3}}{2} \times (2)^2 = 3\sqrt{3} \times 2 \Rightarrow 6\sqrt{3}\ cm^2$

Q21 The length of 3 median of a △ are 9cm, 12 cm, & 15 cm. Find the area of triangle?

Sol^n

$S = \frac{a+b+c}{2} = \frac{9+12+15}{2} = \frac{36}{2} = 18cm$

$\triangle$ area $= \frac{4}{3}\sqrt{18(18-9)(18-12)(18-15)}$

$= \frac{4}{3}\sqrt{18 \times 9 \times 6 \times 3}$

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$= \frac{4}{3} \times 3 \times 2 \times 3 \times 3 \Rightarrow 72\ cm^2$ (Answer)

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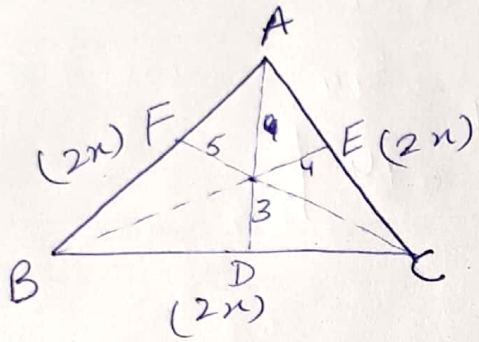
Q22 If the length of the perpendicular from a equilateral triangle on its sides are 3 cm, 4cm, 5cm, then area of the triangle is ?

Soln



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Area of $\Delta = \frac{\sqrt{3}}{4} 4x^2$

$\frac{\sqrt{3}}{4} 4x^2 \Rightarrow \Delta ABG + \Delta BGC + \Delta AGC$

$\Rightarrow \left(\frac{1}{2} \times 2x \times 5\right) + \left(\frac{1}{2} \times 2x \times 3\right) + \left(\frac{1}{2} \times 2x \times 4\right)$

$\Rightarrow \frac{1}{2} \times 2x (5+3+4)$

$\Rightarrow x(12) = 12x$

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$\frac{\sqrt{3}}{4} 4x^2 = 12x$

$\sqrt{3} x^2 = 12x$

$x = \frac{12}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 4\sqrt{3}$

$2x = 8\sqrt{3}$

area of $\Delta = \frac{\sqrt{3}}{4} \times (8\sqrt{3})^2 = \frac{\sqrt{3}}{4} \times 64 \times 3$

$\Rightarrow 48\sqrt{3}$ cm^2

Answer.

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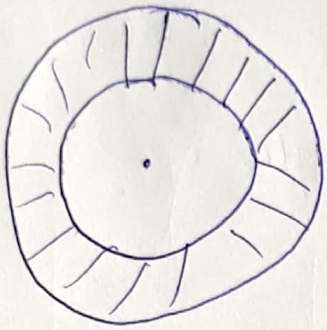
Q23 The area of Ring b/w two concentric circles whose circumferance are 88cm & 132 cm is ?

Sol^n



Circumference $= 2\pi r$

$C_1 = 2\pi r_1$

$\frac{88}{2} = \pi r_1$

$\pi r_1 = 44$

$\boxed{r_1 = 14}$

$C_2 = 2\pi r_2 = 132$

$\boxed{r_2 = 21}$

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~~$r_2 = r$~~

area of circle $= \pi r^2$

area of Ring (Shaded Region) $= \pi (r_2^2 - r_1^2)$

$= \pi (21^2 - 14^2)$

$= \frac{22}{7} (\cancel{245}\ 35)$

$\Rightarrow 22 \times 35$

$\Rightarrow 770\ cm^2$ (Answer)

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Q24 Four equal circles of Radius 'a' units touch one another. The area enclosed b/w them is How much

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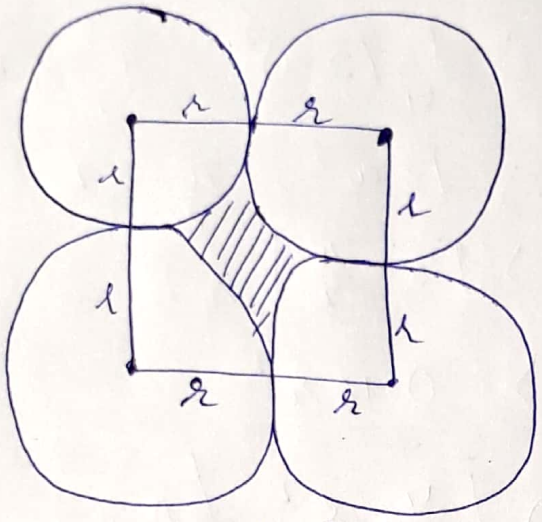
Sol^{n}



→ find the shaded Region area

Side of Square = $2r$

$= (2r)^2 - \pi r^2$

$= 4r^2 - \pi r^2$

$= (4-\pi) r^2$

$= (4 - \frac{22}{7}) r^2$

$= \frac{6}{7} r^2$

$= \frac{6}{7} a^2$ (Answer)

$90 \times (4) = 360^\circ$ → Number of Right angle in $\triangle$.

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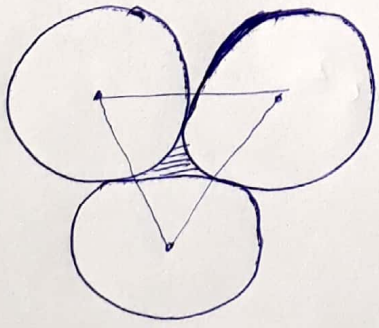
Q25 find the shaded region enclosed between 3 equal radius circles. as shown in figure.



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Sol^n

$$\frac{\pi \times 180}{360}(r)^2 = \frac{\pi}{2} r^2$$ (total angles of triangle)

area of Eq. triangle $= \frac{\sqrt{3}}{4}(2a)^2$

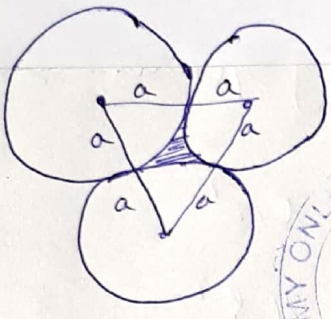
area of shaded portion $\Rightarrow \frac{\sqrt{3}}{4}(2a)^2 - \frac{\pi}{2} a^2$

$\Rightarrow \sqrt{3} a^2 - \frac{\pi}{2} a^2$

$\Rightarrow \left(\sqrt{3} - \frac{\pi}{2}\right) r^2$

$\Rightarrow 0.16 r^2$

$\Rightarrow \boxed{\frac{4}{25} r^2}$ Answer.



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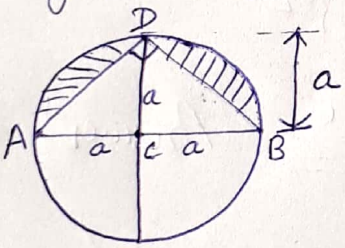
Q26 The area of the shaded region in the fig. given below is ?



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Sol^n

Area of $\Delta ADB = \frac{\pi r^2}{2}$

$AD = \sqrt{a^2 + a^2} = \sqrt{2}\, a$

$\frac{1}{2} \times B \times H = \frac{1}{2} \times a \times a = \frac{1}{2} a^2$

$2\left(\frac{1}{2} a^2\right) = a^2$

$\frac{\pi r^2}{2} - a^2 = \frac{\pi a^2}{2} - \frac{2a^2}{2} \Rightarrow \boxed{a^2\left(\frac{\pi}{2} - 1\right)}$ Answer.

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Q27 If the area of a circle is increased by 22cm then its radius is increased by 1 cm. find the original Radius of circle?

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Soln

Let the original radius = r

New radius $\Rightarrow (r+1)$

$$\pi(r+1)^2 - \pi r^2 = 22$$

$$\pi r^2 + \pi + 2\pi r - \pi r^2 = 22$$

$$\pi(1+2r) = 22$$

$$\frac{22}{7}(1+2r) = 22$$

$$1+2r = 7$$

$$2r = 6$$

$$\boxed{r = 3}$$

Original radius of circle = 3 Cm (Answer)

Q28 The area of the greatest circle inscribed inside a square of side 21 cm is.

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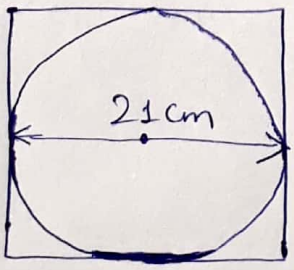
Soln



$r = \frac{21}{2}$

area of circle $= \pi r^2$

$= \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2}$

$\Rightarrow \frac{693}{2} \Rightarrow 346.5 \text{ cm}^2$ Answer

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Q29 The area of equilateral triangle inscribed in a circle is $4\sqrt{3}\ cm^2$. The area of circle = ?

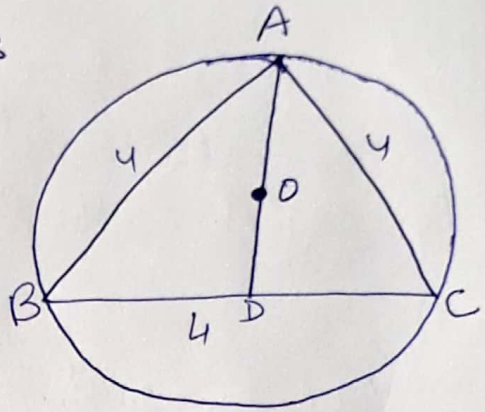
Soln

area of equilateral $\Delta = 4\sqrt{3}$

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

$$a^2 = (4)^2$$

$$\boxed{a = 4}$$



$$AO = \frac{2}{3}AD$$

$$AB^2 = (2)^2 + AD^2$$

$$4^2 - 2^2 = AD^2$$

$$AD = \sqrt{12} = 2\sqrt{3}$$

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

$$AO = \frac{4}{\sqrt{3}} = \text{radius}$$

$$\text{area of circle} = \pi r^2 = \frac{22}{7} \times \frac{4 \times 4}{3} = \frac{16}{3}\pi$$

Answer.

Q30 If the difference b/w the area of the circum circle & the In circle of an equilateral triangle is 44 cm^2, then find the area of triangle = ?

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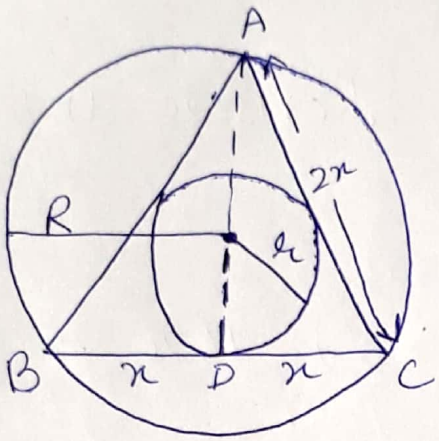
Sol^{n}



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$\pi (R^2 - r^2) = 44$

$AB = BC = CA = 2x$

$AD = \sqrt{4x^2 - x^2}$

$AD = \sqrt{3x^2} = \sqrt{3}\, x$

$OD = \frac{1}{3} \times \sqrt{3}\, x = \frac{x}{\sqrt{3}}$

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

$\frac{22}{7}\left[\left(\frac{2x}{\sqrt{3}}\right)^2 - \left(\frac{x}{\sqrt{3}}\right)^2\right] = 44$

$\frac{4x^2}{3} - \frac{x^2}{3} = 14$

$\frac{3x^2}{3} = 14$

$x = \sqrt{14}$

area of equilateral triangle $= \frac{\sqrt{3}}{4}(2x^2)$

$= \frac{\sqrt{3}}{4} \times 4(\sqrt{14})^2$

$= \sqrt{3} \times 14$

$\Rightarrow 14\sqrt{3}$ (Answer)

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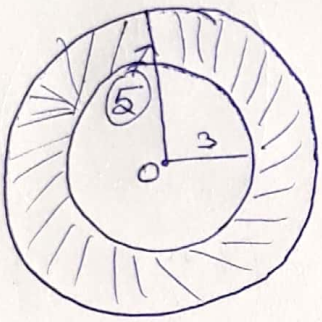
Q31 The area of a circle is proportional to the square of its radius. A small circle of Radius 3 cm is drawn within a larger circle of radius 5 cm. find the Ratio of area of annular zone to the area of the larger circle.

Options

a) 9:16 b) 9:25 Answer c) 16:25 d) 16:27

Sol^{n}



$\pi(5^2 - 3^2) = 16\pi \Rightarrow$ area of annular zone (shaded region)

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area of greater / larger circle

$\Rightarrow \pi(5)^2$

$\Rightarrow 25\pi$

Ratio = 16 : 25 Answer.

Q32 Three circles of Radius 3.5 cm each are placed such a way that each touches the other two. The area of the portion enclosed by the circles is?

option (a) $1.975\ cm^2$ (b) $19.67\ cm^2$

Answer (c) $1.967\ cm^2$ (d) $21.21\ cm^2$

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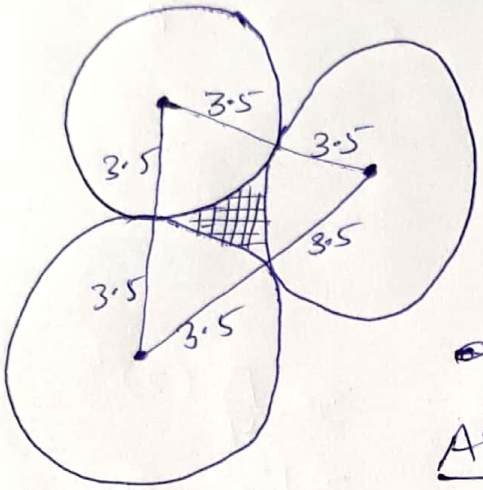
Sol^n



area of $\Delta = \frac{\sqrt{3}}{4}(7)^2$

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

$= \sqrt{3}r^2$

$\frac{\pi \times 180\, r^2}{360} = \frac{\pi}{2} r^2$

Area enclosed =

$\Rightarrow \sqrt{3}r^2 - \frac{\pi}{2}r^2$

$\Rightarrow \left(\sqrt{3} - \frac{\pi}{2}\right) r^2$

$\Rightarrow (1.73 - 1.57) r^2$

$\Rightarrow \frac{16}{100} \times 3.5 \times 3.5$

$\Rightarrow$ 1.967 cm^2 (Answer)

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Q 33 Two circles with centre A & B and radius 2 units touch each other externally at 'C'. A third circle with centre C and radius 2 units meets another two at D & E. Then the area of the Quadrilateral ABDE is ?

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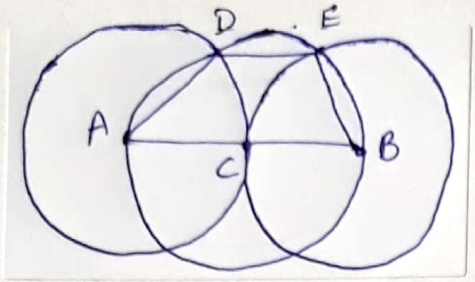
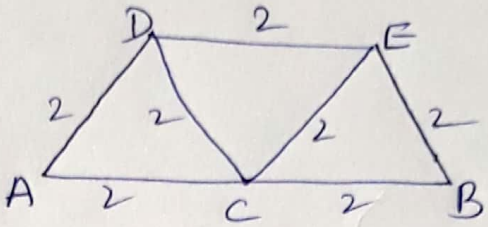
Sol^{n}





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Trapezium ADEB

$$\text{Area} = \frac{1}{2}(AD+DE) \times H$$

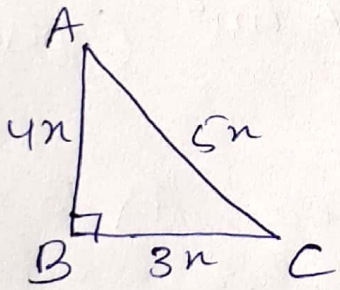
Or

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

$$= 3\sqrt{3} \quad \text{Answer.}$$

Q34 The side of a triangle having area 7776 cm^2 are in the ratio 3 : 4 : 5. Find the perimeter of triangle = ?

Sol^{n}



(3, 4, 5) Right angled triangle

Area of Right angle $\triangle$

$$= \frac{1}{2} \times 3x \times 4x = 6x^2$$

$$6x^2 = 7776$$

$$x^2 = 1296$$

$$\boxed{x = 36}$$

Perimeter $= 3x + 4x + 5x \Rightarrow 12x$

$= 12 \times 36 \Rightarrow \underline{432 \text{ cm}}$ Answer

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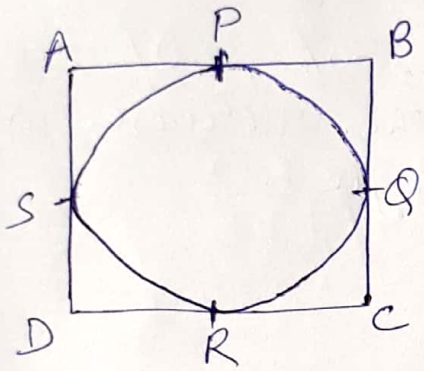
Q35 Quadrilateral ABCD is circumscribed about a circle. If the lengths of AB, BC & CD are 7 cm, 8.5 cm, & 9.2 cm respectively then find the length of DA is?

Sol^n



$$\begin{cases} AP = AS \\ BP = BQ \\ CR = CQ \\ RD = DS \end{cases}$$

$$AP + BP + RC + RD = AS + BQ + CQ + DS$$

$$\underbrace{7}_{} + \underbrace{9.2}_{} = 8.5 + DA$$

$$DA = 16.2 - 8.5$$

$$\boxed{DA = 7.7 \text{ cm}}$$ Answer

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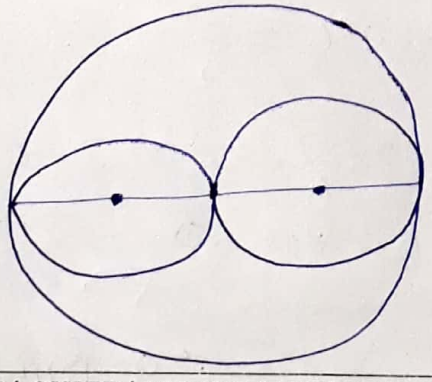
Q36 Two equal max^m sized circular plates are cut off from a circular paper sheet of circumference 352 cm. Then the circumference of each circular plate is?

Sol^n



Dia of larger circle = ?

Circumference Big = 352

$$2\pi r = 352$$

$$r = \frac{352 \times 7}{22 \times 2} = 56$$

$$\boxed{r = 56 \text{ cm}}$$

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Radius of small circle $= \frac{56}{2} = 28$ cm

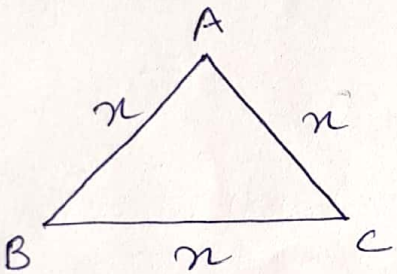
Circumference of small circle $= 2\pi r$

$\Rightarrow 2 \times \frac{22}{7} \times 28$

$\Rightarrow$ 176 cm (Answer)

Q37 If the sides of an equilateral triangle are increased by 20%, 30%, 50% respectively to form a new triangle, the increase in the perimeter of the equilateral triangle is?

Sol^n



Perimeter $= 3x$

New perimeter $= 1.2x + 1.3x + 1.5x$

$= 4x$

Increase in perimeter $= \frac{1}{3} \times 100 \Rightarrow 33\frac{1}{3}\%$ Answer

Q38 The dia of each wheel of a car is 70cm. If each wheel rotates 400 times per min the speed of car = ?

Sol^n circumference of wheel $= 2 \times \frac{22}{7} \times 35 = 220$ cm

Total distance in 1 hour $= 220 \times 400 \times 60 = 5280000$ cm in 1 hr

Speed $= \frac{5280000}{100 \times 1000} \Rightarrow 52.8$ Km/hr (Answer)

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Q39 The diameter of a wheel is 98 cm. The No. of Revolution in which it will cover a distance of 1540m.

Sol^n $2\pi r = 2 \times \frac{22}{7} \times \frac{98}{2} = 308\text{ cm}$

1 Rev. = 308 cm

Number of Revolution $\Rightarrow \frac{154000}{308} \Rightarrow$ **500 Revolution**

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Q40 A horse is tied to a post by a rope. If the horse moves along a circular path always keeping the rope stretched & describes (covers) 88 metres when it has traced out 72° at the centre, the length of Rope is?

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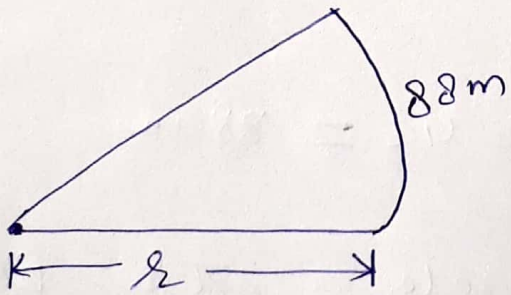
Sol^n



Circumference of arc = 88

$$88 = \frac{2\pi r\theta}{360^\circ} = \frac{2\pi r \times 72}{360} = \frac{2\pi r}{5}$$

$$\frac{88 \times 5 \times 7}{2 \times 22} = \boxed{r = 70\text{m}}$$ Answer.

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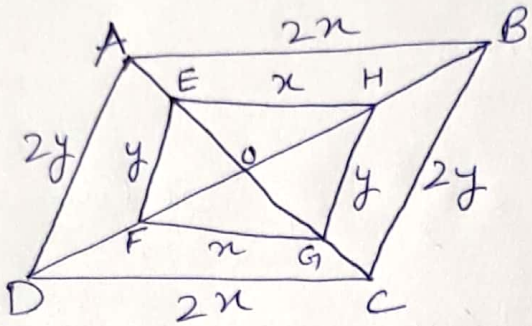
Q41 ABCD is a parallelogram in which diagonals AC & BD intersect at O. If E, F, G & H are the mid points of AO, DO, CO & BO respectively, then the ratio of the perimeter of the Quadrilateral EFGH to the perimeter of parallelogram ABCD is?

Sol^{n}



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Ratio of perimeter $\Rightarrow$ **1 : 2** Answer.

Q42 A wire when bent in the form of a square enclosed an area of 484 Sq. cm what will be the enclosed area when the same wire is bent into a circle.

Sol^{n}

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Area of square = 484

$a^2 = 484$

$a = 22$

perimeter of square = $4a = 88$ cm

Circumference of circle = $2\pi r = 88$

$\Rightarrow r = 14$

Area of circle = πr^2

$= \frac{22}{7} \times 14 \times 14 = 44 \times 14$

$\Rightarrow 616\ cm^2$ (Ans)

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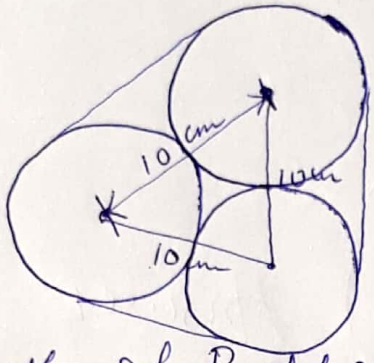
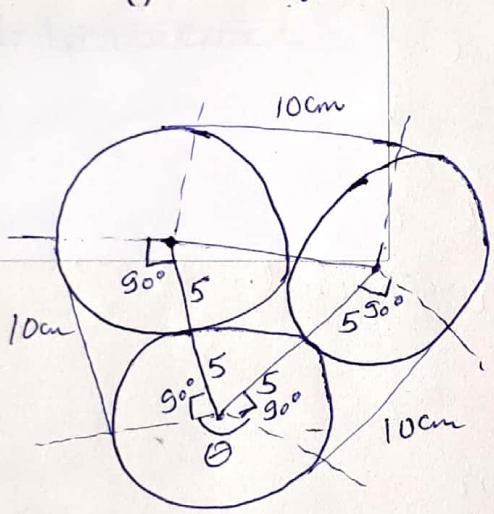
Q43 Three circles of dia 10 cm each are Bounded together by a rubber band as shown in figure.



find The length of Rubber band in cm, ~~if it~~

Sol^{n}



$10 \times 3 = 30$ cm

$$\frac{2\pi r \theta}{360^\circ}$$

$$\theta = [360 - (90^\circ + 90^\circ + 60^\circ)]$$

$$\theta = 120^\circ$$

$$2\pi r \frac{\theta}{360} \times 3$$

$$2\pi r \times \frac{120}{360} \times 3$$

$2\pi r \Rightarrow r = 5 \Rightarrow 2\pi \times 5 = 10\pi$

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Length of Rubber = $\boxed{30+10\pi}$ Answer

Q44 The difference of perimeter & Diameter of a circle is x unit. find the diameter of circle is?

Soln

Perimeter − Diameter = x

$$2\pi r - 2r = x$$

$$2r(\pi - 1) = x$$

Dia $= 2r = \left(\frac{x}{\pi - 1}\right)$ Answer

Q45 A person observed that he require 30 second less time to cross a circular ground along its diameter than to cover it once along the boundary. If his speed was 30 m/min, then the radius of the circular ground is?

Soln

$$2\pi r - 2r = 15m$$

$$2\pi r - 2r = 15m$$

$$2r\left(\frac{22-7}{7}\right) = 15m$$

$$2r = \frac{15 \times 7}{15} m$$

$$\boxed{r = \frac{7}{2} m}$$

$$\boxed{r = 3.5 m}$$ Answer.

{30 sec = $\frac{1}{2}$ min
$\frac{1}{2}$ m → Distance covered = 15m}

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Q46 A car go on a circular path 8 times in 40 minutes. If dia of circle is to be increased by 10 times the original dia the time required by A to go round the new path once travelling at same speed is ?

Sol^n

$40\ min \rightarrow 8$ Revolution

$$\text{Speed} = \frac{2\pi r \times 8}{40} = \frac{16\pi r}{40} = \frac{2\pi r}{5}$$

New Distance $= 10 \times 2\pi r$

$$\text{Time} = \frac{10 \times 2\pi r}{\frac{2\pi r}{5}} = 50\ min$$

Time = 50 min Answer.

Q47 The difference b/w the circumference & dia of circle is 30 cm. then find Radius = ?

Sol^n

$2\pi r - 2r = 30$

$2r(\pi - 1) = 30$

$r\left(\frac{15}{7}\right) = 15$

$r = 7$ cm Answer

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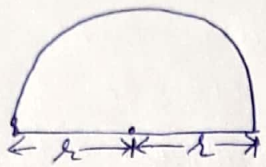
Q 48 The perimeter of a semicircle is numerically equal to the its area is sq. meter. The length of its diameter = ?



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$$\text{perimeter} = \frac{2\pi r}{2} + 2r = (\pi r + 2r)$$

$$\text{area} = \frac{\pi r^2}{2}$$

$$\pi r + 2r = \frac{\pi r^2}{2}$$

$$r(\pi + 2) = \frac{\pi r^2}{2}$$

$$\frac{22}{7} + 14 = \frac{22r}{7 \times 2}$$

$$\frac{36}{7} = \frac{22}{14} r$$

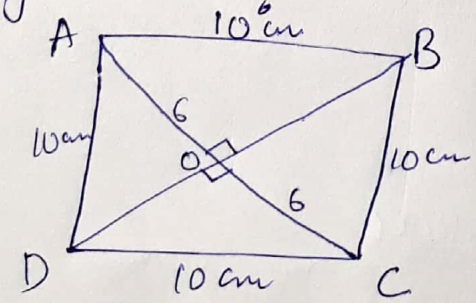
$$r = \frac{36}{11}$$

$$r = 3\frac{3}{11} \text{ metre}$$

Diameter $= 2r \Rightarrow 6\frac{6}{11}$ metre. Answer

Q 49 The perimeter of a Rhombus is 40cm. If one of the diagonal be 12 cm long then length of another diagonal is ?

Sol^n



AC = 12 cm

AB = $\frac{40}{4}$ = 10 cm

AO = OC = 6cm

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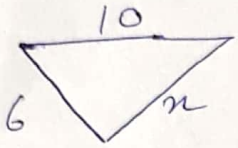


$x^2 = 10^2 - 6^2$

$= 100 - 36$

$x^2 = 64$

$\boxed{x = 8}$

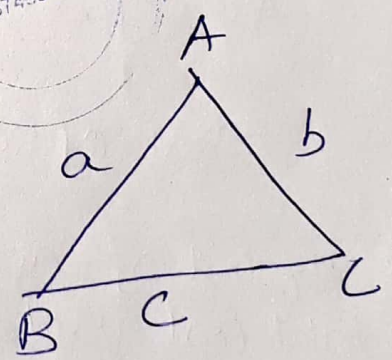
$BD = 2BO = 2 \times 8 = \underline{16\ cm}$ Answer

Q 50 The perimeter of a triangle is 30 cm & its area is $30\ cm^2$. If the largest side measure 13 cm. What is the smallest side length of triangle = ?

Sol^n

$\frac{1}{2} \times B \times H = 30\ cm^2$

$B \times H = 60\ cm^2$



Perimeter = 30

largest = 13

Remaing length = 17 cm

$a + b + c = 30$

$a + b = 17$

$c = 13$

$a = 12$, $b = 5$ as they satisfy Pythagoras Rule

Smallest side = $\underline{5\ cm}$

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Q51 If floor area of is 8m x 6m & the Size of one square tile = 4 decimeter find the number of tiles which is used for flooring.

Sol^n

Area of Room = $48m^2$

Area of tile = $4 \times 4 = 16$ decimeter.

1 m = 10 decimeter

Area of Room = $4\ 8 \times 10 \times 10$ decimeter^2

Number of tiles = $\frac{1200}{4} \Rightarrow$ 300 tiles

Q52 A triangular field whose sides measure 15 m, 20m, 25m. find the cost of sowing seeds at Rate of 5Rs/Sq.m

Sol^n

Area of $\Delta = \frac{1}{2} \times 15 \times 20 = 150\ m^2$

Cost of sowing = $150 \times 5 =$ 750Rs.

Q53 If cost of sowing seed is 25 paisa/Sq.m. The total cost used for sowing is 1000Rs. find the area of field?

Sol^n

Area of field = $\frac{1000}{\frac{1}{4}} =$ 4000 Sq. meter.

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Q54 The Radius of a circular wheel is 1.75 m. find the number of Revolution to cover 11 km.

Sol^n $r = 1.75$

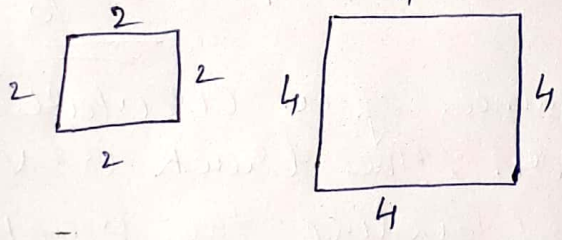
Perimeter $= 2\pi r = 2 \times \frac{22}{7} \times 1.75 = 11$ m

Distance $= 11000$ m

No. of Revolution $= \frac{11000}{11} = 1000$ Revolution.

Q55 If each edge of a square be doubled, then increase in % area = ?

Sol^n



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area = 4 area = 16

% increase $= \frac{12}{4} \times 100 = 300\%$

Q56 If Radius of a circle is increased by 5% then increase in its area is.

Sol^n Let original Radius be 100

$\pi (100)^2 \Rightarrow$ area original $= 10000\pi$

New Radius $= 105$

area New $= \pi (105)^2 = 11025\pi$

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% increase in area $= \frac{1025}{10000} \times 100 = 10.25\%$

Q57 The height of a triangle is increased by 10%, TO retain the orignal area of the triangle its correspondig Base must be decreased by.

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Sol^n

10% Increase $= \frac{11}{10}$

To Retain same area we have to decrease base by $\frac{10}{11} \Rightarrow \frac{1}{11} \Rightarrow 9\frac{1}{11}\%$ Answer.

Q58 The % increase in area of Rectangle if each Side is increased by 20%

Sol^n effective increase $\Rightarrow 20+20+\frac{20\times20}{100}$

$\Rightarrow 40+4 \Rightarrow 44\%$

Q59 The outer circumfrance of a circular race track is 528 meter. The track is everywhere 14m wide. cost of leveling the track @ 10 Rs per sq. meter.

Sol^n

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$2\pi r = 528$

$r = \frac{528\times7}{2\times22} = 84$

$r_{small} = 84-14 = 70$

$\pi R^2 - \pi r_{small} \Rightarrow \pi(84^2-70^2)$

$\Rightarrow \frac{22}{7}(7056-4900) \Rightarrow \frac{22}{7}\times2156 = 6776$ sq. m

Cost $= 6776\times10 = 67760$ Rs/-

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Q60 Two right circular cylinder of equal volume having their heights in the Ratio 1:2 The ratio of their Radii is ?

Soln

$$r_1^2 \pi h_1 = \pi h_2 r_2^2$$

$$1 \cdot r_1^2 = r_2^2 2$$

$$\frac{r_1^2}{r_2^2} = \frac{2}{1}$$

$$\frac{r_1}{r_2} = \frac{\sqrt{2}}{\sqrt{1}} \Rightarrow \boxed{\sqrt{2} : 1}$$ Answer.

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Q61 The volume of a Right circular cylinder whose height is 40cm & circumference of base is 66cm

Soln volume of Cylinder $= \pi r_1^2 h$

$$P = 2\pi r = 66$$

$$2 \times \frac{22}{7} \times r = 66$$

$$\boxed{r = 10.5}$$

$$\text{Volume} = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \times 40 \Rightarrow \underline{13860\ cm^3}$$

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Q62 The base of Radii of two cylinder are in the Ratio 2:3 & height are in Ratio 5:3, The Ratio of volumes is?

Sol^n

$$\pi r_1^2 h_1 : \pi r_2^2 h_2$$

$$(2)^2 \times 5 : (3)^2 \times 3$$

$$\boxed{20 : 27}$$ Answer.

Q63 The curved Surface area of cylinder pillar is 264 m^2. & its volume is 924 m^3. find the Ratio of its diameter & its height.

Sol^n

$$CSA = 264\ m^2$$
$$Volume = 924\ m^3$$

$$CSA \Rightarrow 2\pi r h = 264$$
$$Volume \Rightarrow \pi r^2 h = 924$$

$$\frac{CSA}{Volume} = \frac{2\pi r h}{\pi r^2 h} = \frac{2}{r}$$

$$\frac{2}{r} = \frac{264}{924}$$

$$r = \frac{2 \times 924}{264} = 7$$

$$\boxed{r = 7}$$

$$CSA = 2 \times \frac{22}{7} \times 7 \times h = 264$$

$$\boxed{h = 6}$$

$$D : h \Rightarrow 14 : 6 \Rightarrow \boxed{7:3}$$ Answer

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Q64 A hollow cylinder tube 20 cm long & is made of iron & external & internal diameter are 8cm & 6 cm respectively. The volume of iron used to make the cylinder?

Sol^n $r_{out} = 4$ cm
$r_{in} = 3$ cm

$V_{out} = \pi r_o^2 h = \frac{22}{7} \times 16 \times 20$

$V_{inner} = \pi r_{in}^2 h = \frac{22}{7} \times 9 \times 20$

$\Rightarrow \frac{22}{7} \times 20(16-9) \Rightarrow 440 cm^3$ (Answer)

Q65 A hollow iron pipe is 21 cm long & its exterior diameter is 8cm. If the thickness of the pipe is 1 cm & iron wt 8 gm/cm^3 then total weight of pipe = ?

Sol^n $r_{ex} = 4$ cm
$r_{in} = 3$ cm
$H = 21$ cm

Volume of iron $= \frac{22}{7} \times 21 \times (16-9)$
$= 22 \times 21 \times 8$
$= 3.696$ Kg

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Q66 A right circular cylinder of height 16cm is covered by a rectangular tin foil of size 16cm × 22 cm. The volume of the cylinder is?

Sol^n

$h = 16$

$CSA = 2\pi rh$

$2 \times \frac{22}{7} \times r \times 16 = 16 \times 22$

$r = \frac{7}{2} = 3.5\text{cm}$

Volume of cylinder $= \pi r^2 h$

$= \frac{22}{7} \times 3.5 \times 3.5 \times 16$

$= 11 \times 3.5 \times 16$

$= 616\ \text{cm}^3$

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Q67 Volume of metal of cylindrical pipe is $748\ \text{cm}^3$. The length of the pipe is 14cm & its external radius is 9cm. Its thickness is?

Sol^n

$\pi r^2 h = 748$

$h = 14$

$r_{out} = 9$

$r_{in} = ?$

$\frac{22}{7}(81 - r_{in}^2)14 = 748$

$\boxed{r_{in} = \sqrt{64} = 8}$ Answer

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Q68 water is being pumped out through a circular pipe whose internal dia = 7cm. If water flow 12 cm/sec how many litre of water is pumped in one hour?

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Soln $d = 7$ in

$r = 3.5$ in

$h = 12$

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Volume $= \pi r^2 h$

$= \frac{22}{7} \times 3.5 \times 3.5 \times 12 = 462 \text{ cm}^3/\text{sec}$

Volume of water/Quantity of water

$= \frac{462 \times 36}{10000} \Rightarrow 1663.2$ ltr

Q69 The CSA & TSA of a cylinder are in Ratio 1:2. Total surface area is 616 cm^3. find the volume of cylinder?

Soln

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$CSA = 2\pi rh$

$TSA = 2\pi rh + 2\pi r^2$

$= 2\pi r(r+h)$

$\frac{CSA}{TSA} = \frac{1}{2} = \frac{2\pi rh}{2\pi r(r+h)}$

$2\pi r(r+h) = 4\pi rh$

$r + h = 2h$

$\boxed{r = h}$

$TSA = 616$

$2\pi r(r+r) = 616$

$\pi r(2r) = 308$

$r^2 = 7 \times 7$

$\boxed{r = 7}$

$\boxed{h = r = 7}$

Volume of cylinder

$\Rightarrow \frac{22}{7} \times 49 \times 7$

$\Rightarrow 49 \times 22$

$\Rightarrow 1078 \text{ cm}^3$ (Answer)

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Q70 If diagonal of a cube is $\sqrt{12}$ cm. Then its volume in cubic cm is?

Sol^n

$D^2 = a^2 + a^2 + a^2$

$D^2 = 3a^2$

$D = \sqrt{3}a$

$\sqrt{12} = \sqrt{3}a$

$a = \frac{\sqrt{12}}{\sqrt{3}} = \sqrt{4} = 2$

$\boxed{a = 2}$

Volume $= (2)^3 = 8\ cm^3$

(Answer)

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Q71 If the volume of two cube are in the Ratio 27 : 1, then ratio of their edge is?

Sol^n

Volume = 27 : 1

edge $= \sqrt[3]{27} : \sqrt[3]{1}$

$\Rightarrow \boxed{3 : 1}$ (Answer)

Q72 A wooden box measure 20cm × 12 cm × 10cm, thickness of wood is 1cm, Volume of wood to make the Box = ?

Sol^n

$V_{out} = 12 \times 10 \times 20 = 2400\ cm^3$

$V_{in} = 10 \times 8 \times 18 = 1440\ cm^3$

$V_{wood} = 2400 - 1440 = \underline{960\ cm^3}$

(Answer)

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Q 73 Water flows into a tank which is 200 m long & 150 m wide through a pipe of cross section 0.3 m × 0.2 m at rate 20 km/hr. Then time (in hr) for the water level in the tank to reach 8 m.

Soln Volume of tank = 200 × 150 × 8
= 240000 m^3

V_{pipe} = 0.3 m × 0.2 m

$\Rightarrow \frac{3 \times 2 \times 20 \times 1000}{100}$

$V_{pipe} \Rightarrow 1200$

time to fill the tank = $\frac{2400\,00}{12\,00}$ (200)

$\boxed{t = 200 hr}$ Answer

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Q 74 The edge of a cuboid are in the ratio 1:2:3 & its surface area is 88 cm^2. The volume of the cuboid is ?

Soln $2(lb + bh + lh) = 88$

$lb + bh + lh = 44$

$2x^2 + 6x^2 + 3x^2 = 44$

$11x^2 = 44$

$x^2 = 4$

$\boxed{x = 2}$

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Volume of cuboid = $2 \times 4 \times 6 \Rightarrow 48\ cm^3$ (Answer)

Q75 A cuboidal water tank has 216 dm unit of water & its depth is $\frac{1}{3}$ of l & $B = \frac{1}{2}\left[\frac{1}{3}(l-d)\right]$ find length = ?

Sol^n

$l = x$ dm

$h = \frac{x}{3}$ dm

$b = \frac{1}{2}\left[\frac{1}{3}\left[\frac{2x}{3}\right]\right]$

$b = \frac{x}{9}$ dm

1 ltr = 1 dm

Volume = 216 dm

$x \times \frac{x}{3} \times \frac{x}{9} = \frac{x^3}{27}$

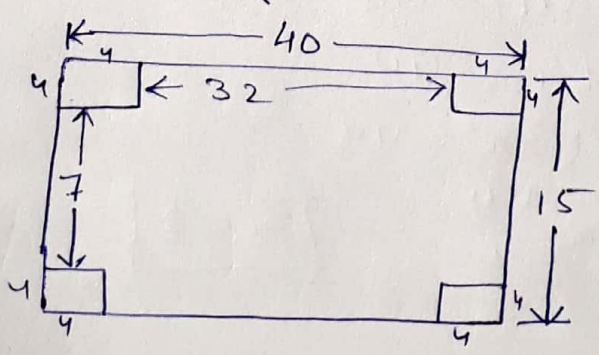
$\frac{x^3}{27} = 216$

$x^3 = 216 \times 27$

$\boxed{x = 3 \times 6 = 18 \text{ dm}}$ Answer.

Q76 A regular sheet of metal is 40 cm by 15 cm. Equal square of 4 cm are cut at the corners & remaining is folded upto form of an open Rectangular box. find the volume of box.

Sol^n



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open Rectangular formed of volume

$$\text{Volume} = h \times l \times b = 4 \times 32 \times 7$$

$$= \underline{896\ cm^3} \quad \text{(Answer)}$$

Q77 The area of three constant face of cuboid are $12\ cm^2 \times 20\ cm^2 \times 15\ cm^2$, the volume of cuboid = ?

Soln

$$V = l \times b \times h$$

$$l \times b = 12$$
$$b \times h = 20$$
$$h \times l = 15$$

$$l^2 b^2 h^2 = 12 \times 20 \times 15 = 3600$$

$$lbh = \sqrt{3600} = 60\ cm^3$$

$$\boxed{V = lbh = 60\ cm^3}$$ Answer

Q78 If length of a godown = 15m, & breadth of godown = 12m, the area of floor + ceiling is equal to area of wall. Then find the volume of Room?

Soln

$$2(15 \times 12) = 360$$

$$360 = 2(15 \times h) + (2 \times 12 \times h)$$

$$360 = 2h \times 27$$

$$\boxed{h = \frac{20}{3}}$$

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Volume $= \frac{20}{3} \times 15 \times 12 = 60 \times 20 = 1200\ m^3$

Q79 The Ratio of the Volume of two cone is 2:3 & the ratio of radii of their Base is 1:2. The ratio of their height is ?

Soln

Volume of Cone $= \frac{1}{3}\pi r^2 h$

$$\frac{\frac{1}{3}\pi r_1^2 h}{\frac{1}{3}\pi r_2^2 h} = \frac{2}{3}$$

$$\frac{r_1^2 h_1}{r_2^2 h_2} = \frac{2}{3}$$

$$\frac{1 \times h_1}{4 \times h_2} = \frac{2}{3}$$

$$\frac{h_1}{h_2} = \frac{8}{3} \Rightarrow \boxed{8:3}\ \text{Answer}$$

Q80 If the height of a given cone be doubled & Radius of Base remains same the ratio of the Volume of the given cone to that of the second cone will be ?

Soln

$\frac{1}{3}\pi r_1^2 h_1 : \frac{1}{3}\pi r_2^2 h_2$

Radius is same

$r_1^2 h_1 : r_2^2 h_2$

$\boxed{h_1 : h_2 = 1:2}$ Answer.

Volume $\Rightarrow \boxed{1:2}$ Answer.

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Q81 Each of the measure of the radius of base of cone & that of a sphere is 8 cm. Also the Volume of the two solids are equal. The slant height of the cone is?

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Soln $l^2 = r^2 + h^2$

$l^2 = h^2 + 8^2$

Volume of sphere $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times 8 \times 8 \times 8.$

$= 2145.524$

Volume of cone $= \frac{1}{3} \times \frac{22}{7} \times 64 \times h$

$h = \frac{3 \times 4 \times 8}{3} = 32.$

$l^2 = 32^2 + 64$

$l^2 = \sqrt{1024 + 64} = \sqrt{1088}$

$\boxed{l = 8\sqrt{17}}$ Answer

Q82 A cone of height 15 cm & dia 30 cm is cut out of wooden sphere of Radius 15 cm find the % of wood wasted?

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Sol^n

Vol. of sphere $= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi \times 15 \times 15 \times 15$

$= 99000 \text{ cm}^3$

Vol. of cone $= \frac{1}{3} \times \frac{22}{7} \times 225 \times 15$

$= 24750$

Wastage $= 99000 - 24750 = 74250$

% wastage $= \frac{74250}{99000} \times 100 \Rightarrow 75\%$

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Q82 If the area of Base of cone is 770 cm^2 & area of C.S.A (curved surface area) $= 814 \text{ cm}^2$ then find its volume?

Sol^n

area of Base $= 770 \text{ cm}^2$

$\pi r^2 = 770$

$\frac{22}{7} \times r^2 = 770$

$\boxed{r = 7\sqrt{5}}$

C.S.A $= \pi r l = 814$

$\frac{22}{7} \times 7\sqrt{5} \times l = 814$

$l = \frac{814 \times 7}{22 \times 7\sqrt{5}} = \frac{37}{\sqrt{5}}$

$\boxed{l = \frac{37}{\sqrt{5}}}$

$l^2 = h^2 + r^2$

$\left(\frac{37}{\sqrt{5}}\right)^2 = h^2 + (7\sqrt{5})^2$

$h^2 = \frac{144}{5}$

$\boxed{h = 12/\sqrt{5}}$

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Volume $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times (7\sqrt{5})^2 \times \frac{12}{\sqrt{5}}$

$= 22 \times 7 \times 4 \times \sqrt{5} = \boxed{616\sqrt{5}}$ Answer.

Q84 A hollow spherical metallic ball has an external diameter 6 cm & is $\frac{1}{2}$ cm thick. The volume of the ball in cm^3 is?

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Soln Vol. of sphere $= \frac{4}{3}\pi r^3$

Volume $= \frac{4}{3}\pi \left(\frac{27 \times 8}{8} - \frac{125}{8} \right)$

$= \frac{4}{3}\pi \left(\frac{91}{8} \right) = \frac{11 \times 13}{3}$

$\Rightarrow 47\frac{2}{3}$ (Answer)

Q85 If both the Radius & height of a right circular cone are increased by 20%, its Volume will be increased by?

Soln Volume of cone $= \boxed{\frac{1}{3}\pi} r^2 h$

Constant.

$r \times r \times h$ → changing.

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effective increase % $= 20 + 20 + \frac{20 \times 20}{100}$

$= 44$

then $= 44 + 20 + \frac{44 \times 20}{100}$

$= 64 + 8.8$

$= \boxed{72.8\ \%}$ Answer.

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