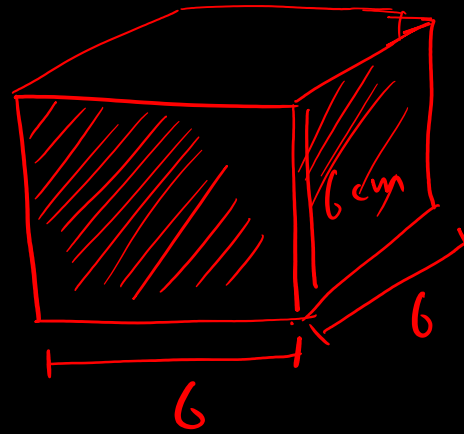


Mensuration

Surface area of cube cube length of side is 6 cm.

$$a = 6 \text{ cm.}$$

$$\begin{aligned} \underline{\underline{\text{S.A. Cube}}} &= \underline{\underline{6a^2}} \\ &= 6 \times 6^2 \\ &= 6 \times 36 \\ &= \underline{\underline{216 \text{ cm}^2}} \end{aligned}$$



S.A. of cuboid

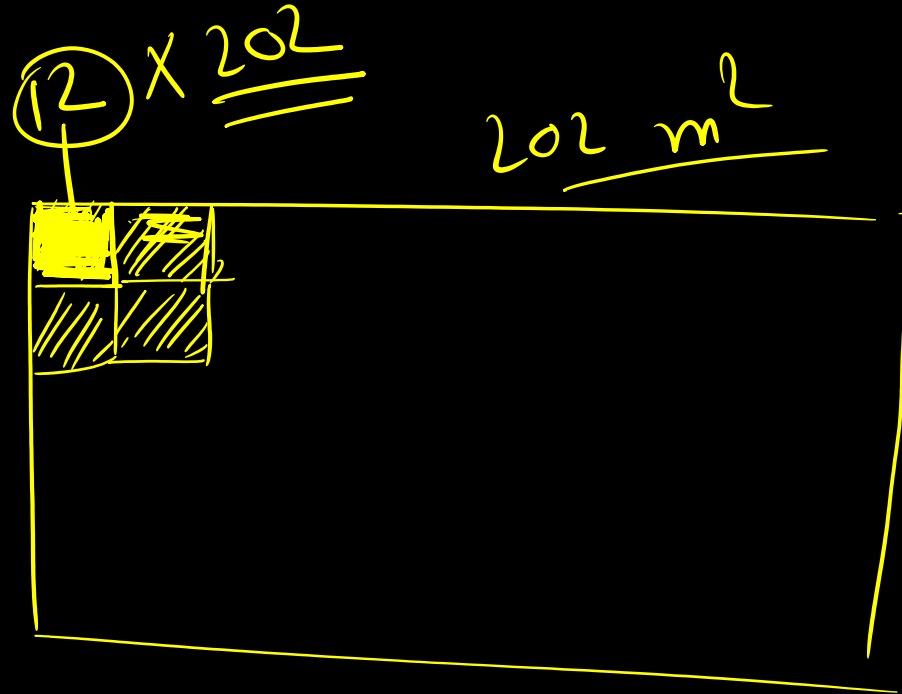
l, b, h.

$$\text{S.A. of cuboid} = \underbrace{2} \underbrace{lxh} + \underbrace{2} \underbrace{lx b} + \underbrace{2} \underbrace{xbh}$$

$$SA = 2(lb + bh + lh)$$

Q. Find the cost of painting a box whose length, width and height are 5 m, 4 m, 9 m respectively. at the rate of ₹ 12 per sq. meter.

$$\begin{array}{r} 2020 + \\ 404 \\ \hline \text{₹ } 2424 \end{array}$$



$$\text{₹ } \underline{\underline{1884}}$$

Cylinder Solid

$$\boxed{\text{Total Surface Area} = 2\pi r^2 + 2\pi r h}$$

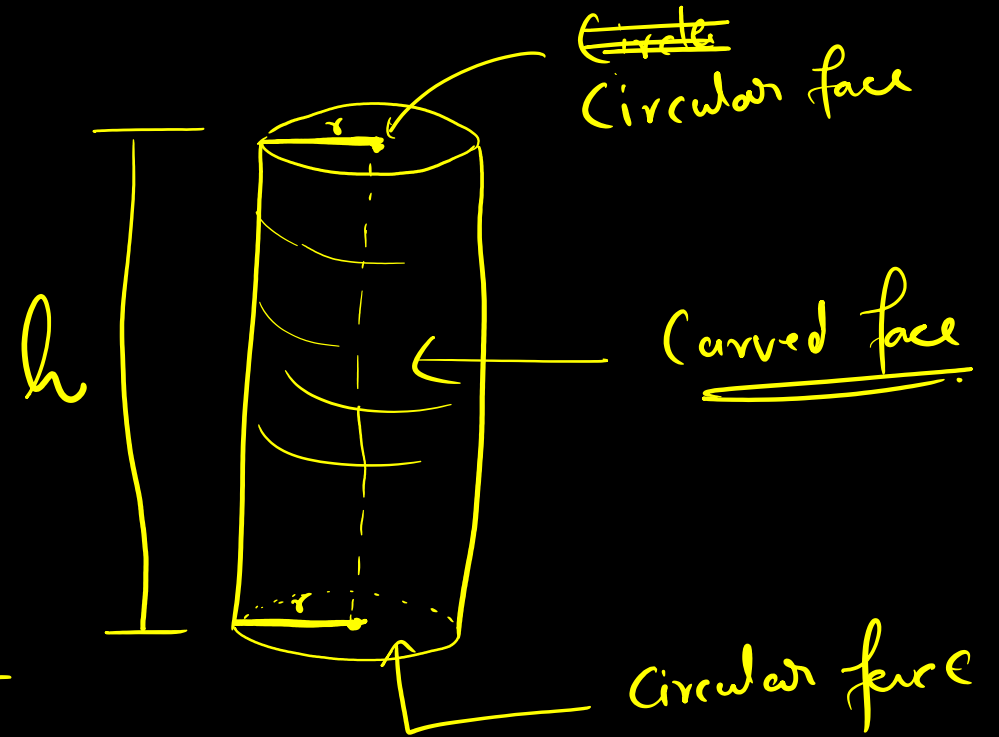
(CSA)

$$\text{Curved Surface Area of cylinder} = \underline{2\pi r h}$$

$$\text{Area of circular top \& bottom face} = \underline{2\pi r^2}$$

$$\begin{aligned} \text{Total Surface area of solid cylinder} &= \underline{\text{CSA}} + \text{area of circular top \& bottom.} \\ &= \underline{2\pi r h} + \underline{2\pi r^2} \end{aligned}$$

$$\text{TSA cylinder} = 2\pi r (h + r)$$



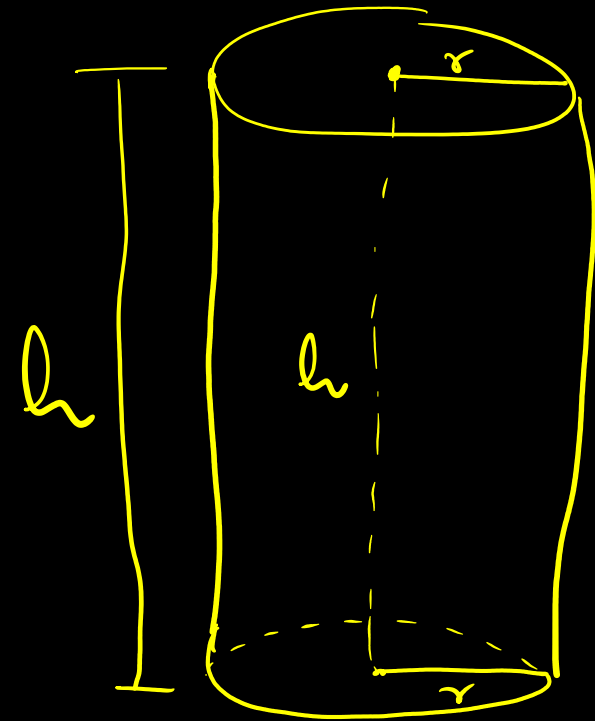
Volume of Solid cylinder

$$\text{Volume} = \frac{\text{area of base} \times \text{height}}$$

$$= \text{area of bottom circle} \times \text{height}$$

$$= \pi r^2 \times h.$$

$$\boxed{\text{Volume} = \pi r^2 h}$$



Q. Find the length of the sides of a cube whose volume is 216 cm^3 .

Ans.

$$l^3 = 216 \text{ cm}^3$$

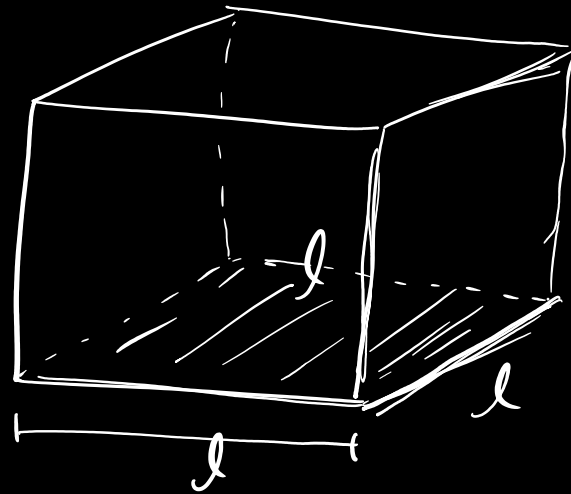
$$l = \sqrt[3]{216}$$

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

$$= 2 \times 3$$

$$l = \underline{6 \text{ cm}}$$

2	216
2	108
2	54
3	27
3	9
3	3
	1



$$\text{area} = l \times l = l^2$$

$$\begin{aligned} \text{volume} &= \text{area of base} \times \text{height} \\ &= \underline{l^2} \times l = \underline{l^3} \end{aligned}$$

$$\sqrt{\boxed{16}} = \underline{\underline{4}} \quad \sqrt{4^2}$$

$$\sqrt{16} = \sqrt{\underbrace{2 \times 2} \times \underbrace{2 \times 2} \times 1}$$

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

$$= 2 \times 2 \times 1$$

$$= \underline{\underline{4}}$$

$$25^2 = 625$$

$$\underline{\underline{25}} = \sqrt{\underline{\underline{625}}}$$

2	16
2	8
2	4
2	2
	1

$$\sqrt{1} = 1$$

$$\sqrt[3]{1} = 1$$

$$3^2 = 9$$

$$\boxed{3 = \sqrt{9}}$$

$$4^{\boxed{2}} = 16$$

$$4 = \sqrt{16}$$

$$2^3 = 8$$

$$2 = \sqrt[3]{8}$$

$$4^3 = \cancel{64}$$

$$\sqrt[3]{64} = 4$$

$$6^3 = 216$$

$$\sqrt[3]{216} = 6$$

$$\begin{array}{r|l} 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

$$\begin{array}{r} 36 \\ 6 \\ \hline 216 \end{array}$$

$$\begin{aligned} \sqrt[3]{64} &= \sqrt[3]{\underbrace{2 \times 2 \times 2} \times \underbrace{2 \times 2 \times 2}} \\ &= 2 \times 2 \sqrt[3]{1} \\ &= 4 \end{aligned}$$

Find the curved S.A. of a cylinder whose radius is 7 cm and height 14 cm.

Sol:

$$\begin{aligned} \text{C.SA of cylinder} &= 2\pi r h. \\ &= 2 \times \pi \times 7 \times 14 \\ &= 2 \times \frac{22}{7} \times 7 \times 14 \\ &= 44 \times 14 \\ &= \underline{\underline{616}} \text{ cm}^2 \end{aligned}$$

$$\pi = \frac{22}{7} = 3.14$$

$$\frac{22}{7} = 3.14 \dots \dots$$

$$\underline{\underline{615.44}} \text{ cm}^2$$

Find the volume of a ^{solid} cylinder whose diameter is 16 cm and height is 21 cm.

Sol. Given, diameter = 16 cm., $r = \frac{16}{2} = 8 \text{ cm.}$
 $h = \underline{\underline{21 \text{ cm.}}}$ ✓

$$\begin{aligned} \text{Volume of cylinder} &= \pi r^2 h \\ &= \pi \times 8^2 \times 21 \end{aligned}$$

$$= \underline{\underline{4224 \text{ cm}^3}} \quad \checkmark$$

Q. The volume of a cylinder is 4224 cm^3 and its height is 21 cm .
Find its diameter.

Sol:

$$\text{Volume} = 4224 \text{ cm}^3$$

$$h = 21 \text{ cm.}$$

$$d = ?, \quad r = ?$$

$$\text{Volume of cylinder} = 4224 \text{ cm}^3$$

$$\pi r^2 h = 4224$$

$$\pi r^2 \times 21 = 4224$$

$$r = 8 \text{ cm}, \quad d = 2r = 16 \text{ cm}$$

$$\frac{\pi r^2 \times 21}{\pi \times 21} = \frac{4224}{\pi \times 21}$$

$$r^2 = \left(\frac{4224}{21 \times \pi} \right)$$

$$r^2 = \frac{4224}{21 \times \pi}$$

$$\frac{3 \cancel{2} \times \left(\frac{22}{7} \right)}{1408} \quad 64$$

$$r^2 = \frac{4224}{3 \times 22} = \frac{1408}{22}$$

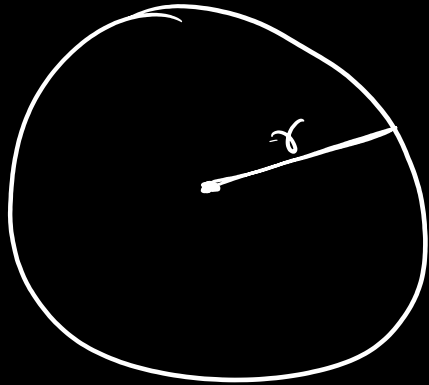
$$r^2 = 64$$

$$r = \sqrt{64}$$

$$r = 8$$

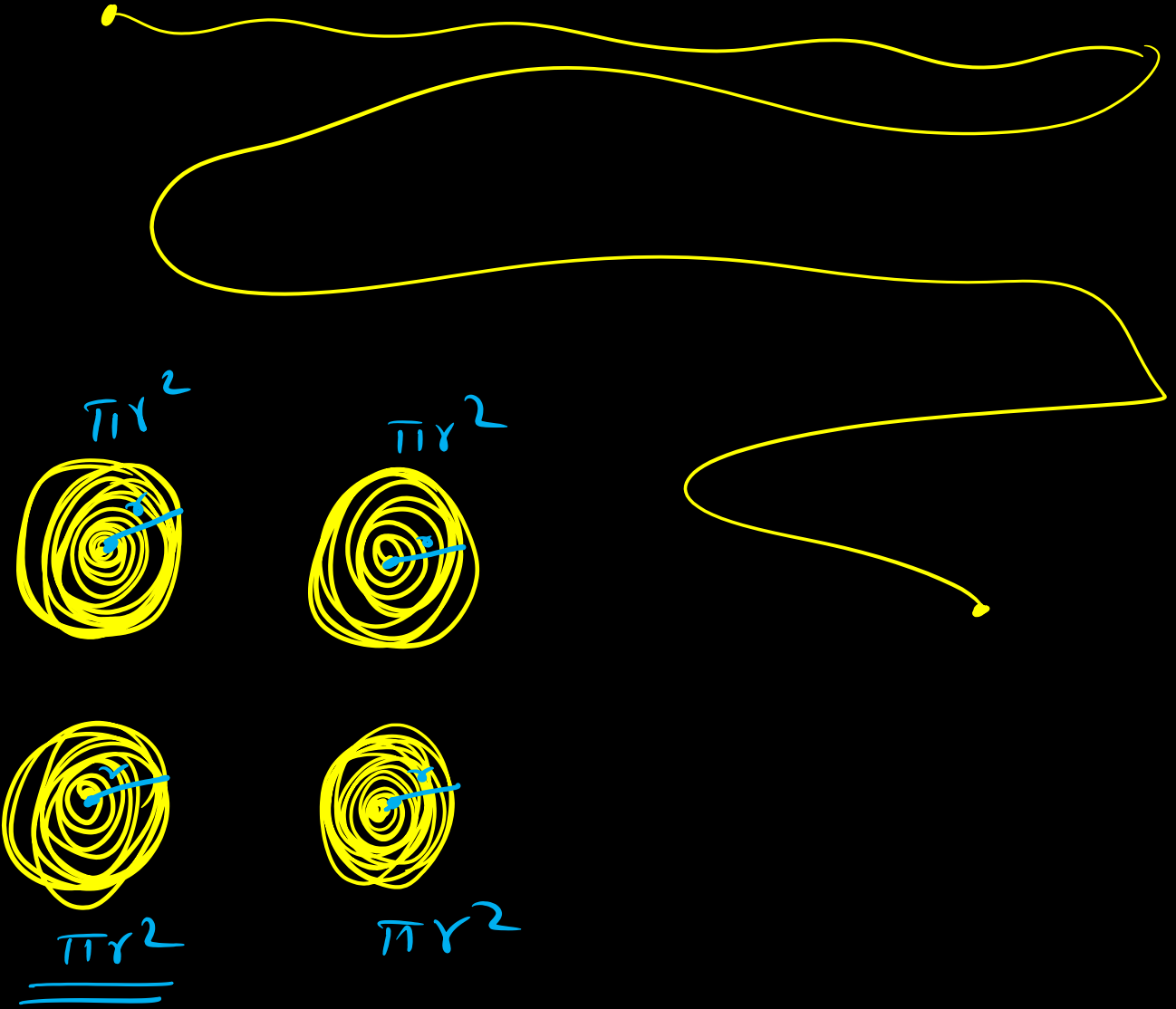
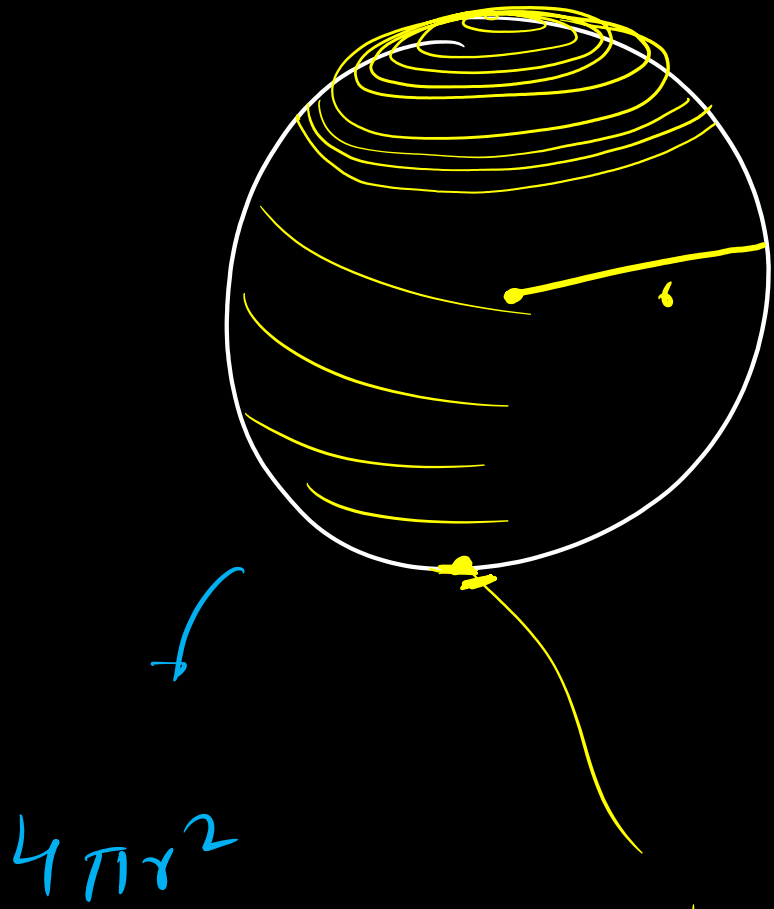
Sphere

Surface area of sphere :



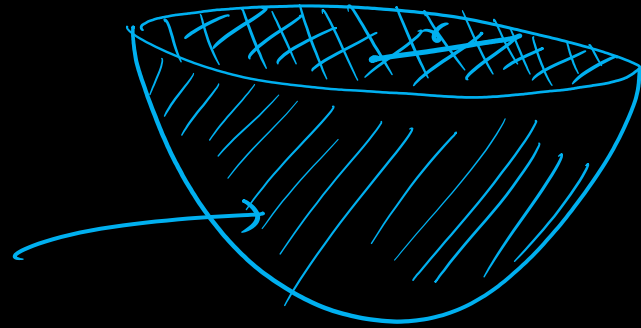
$$\underline{\text{C.S.A. of sphere}} = \underline{\underline{4\pi r^2}}$$

r \Rightarrow Radius of sphere

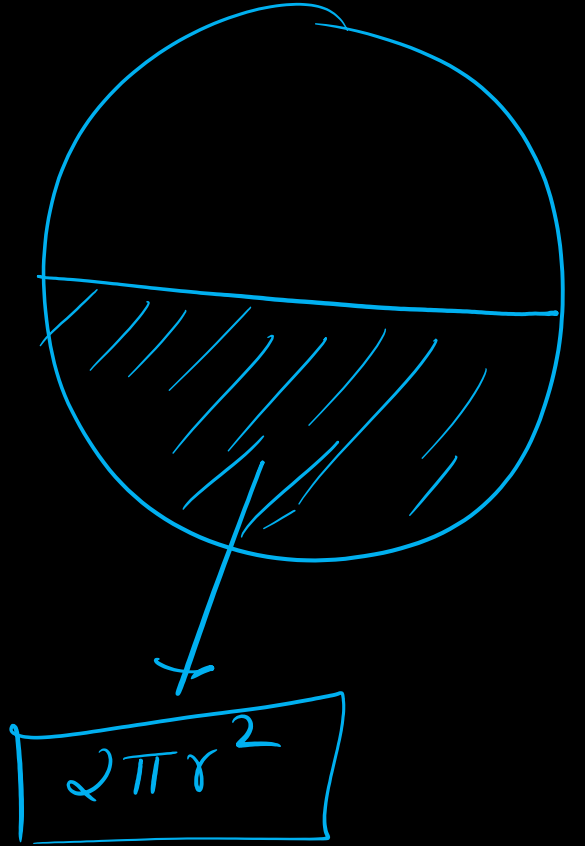


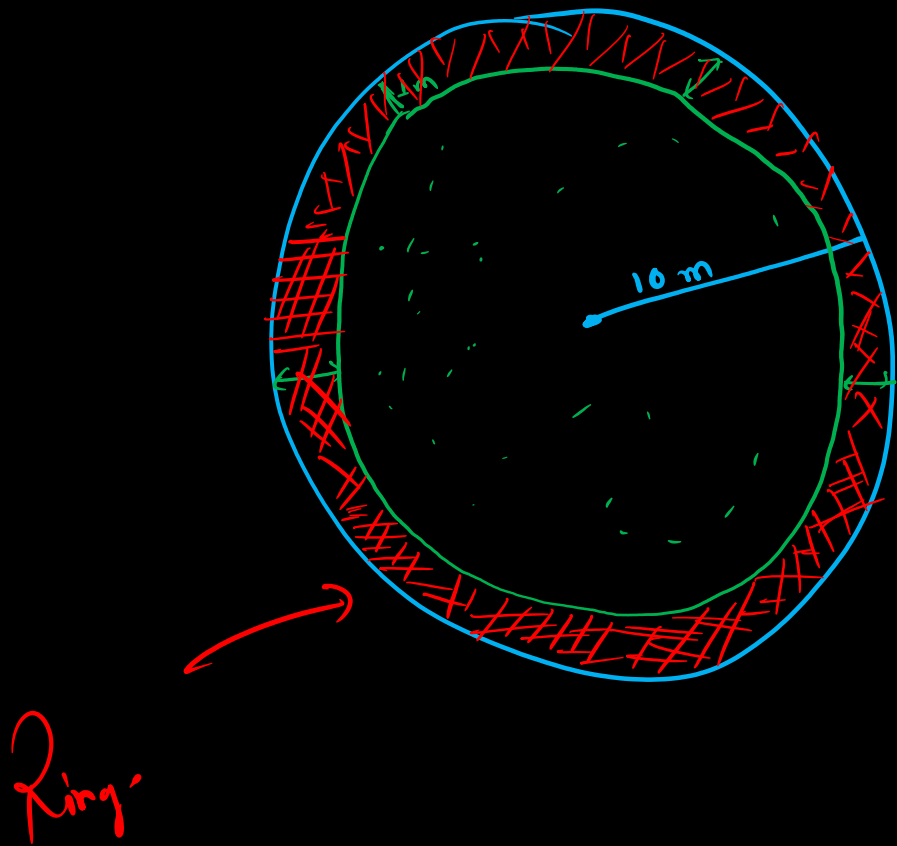
Solid hemisphere

$$\underline{\text{C.S.A.}} = \underline{2\pi r^2}$$



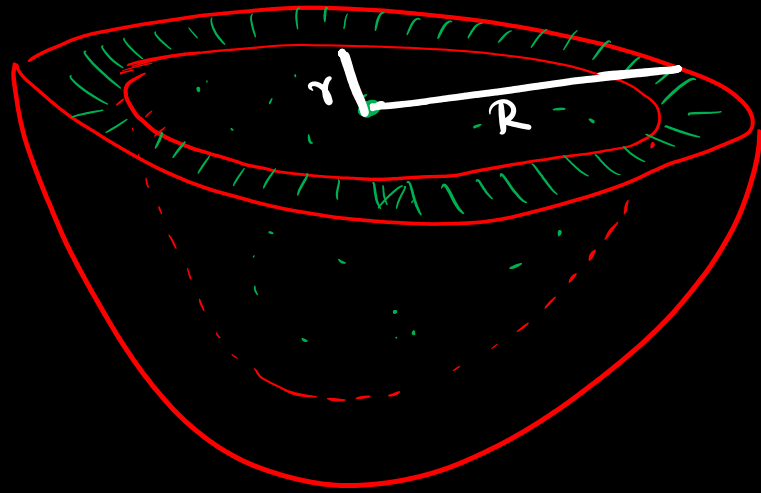
$$\begin{aligned}\underline{\text{T.S.A. of solid hemi-sphere}} &= \underline{\text{C.S.A.}} + \text{area of circle.} \\ &= 2\pi r^2 + \pi r^2 \\ &= \underline{\underline{3\pi r^2}}\end{aligned}$$





$$\begin{aligned}\text{Area of path} &= \pi(10)^2 - \pi(9)^2 \\ &= \pi(100 - 81) \\ &= \underline{19\pi \text{ m}^2}\end{aligned}$$

$$\text{Area of Ring} = \text{Area Bigger Circle} - \text{Area of smaller circle.}$$



$$\underline{\text{Area of outer curved surface} = 2\pi R^2}$$

$$\underline{\text{Area of inner curved surface} = 2\pi r^2}$$

$$\underline{\text{Area of ring} = \pi R^2 - \pi r^2}$$

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

$$\underline{\text{Total Surface area of Hollow Hemisphere}} = 2\pi R^2 + 2\pi r^2 + (\pi R^2 - \pi r^2)$$

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

$$= \pi (3R^2 - r^2)$$

Q. Find the surface area of ~~the~~ a hemisphere whose radius is 28 cm.

$$\begin{aligned} SA &= 2\pi r^2 + \underline{\underline{\pi r^2}} \\ SA &= 3\pi r^2 \\ &= 3 \times \frac{22}{7} \times \overset{4}{\cancel{28}} \times 28 \\ &= 12 \times 22 \times 28 \\ &= \underline{\underline{7392}} \text{ cm}^2 \end{aligned}$$

Q. Find the curved surface area of a hollow hemisphere whose outer and inner radius are 14 cm and 12 cm respectively.

$$C.S.A. = 2\pi(14)^2 + 2\pi(12)^2$$

$$= 2\pi(14^2 + 12^2)$$

$$= 2\pi(196 + 144)$$

$$= 2\pi(340)$$

$$= 2 \times \pi \times 340$$

$$= \frac{680\pi \text{ cm}^2}{}$$

$$= 680 \times 3.14 \text{ cm}^2$$

$$= \underline{\underline{2135.2 \text{ cm}^2}}$$

$$\begin{array}{r} 14 \\ 14 \\ \hline 196 \end{array}$$

$$9^2 = 81$$

$$10^2 = 100$$

$$11^2 = 121$$

$$12^2 = 144$$

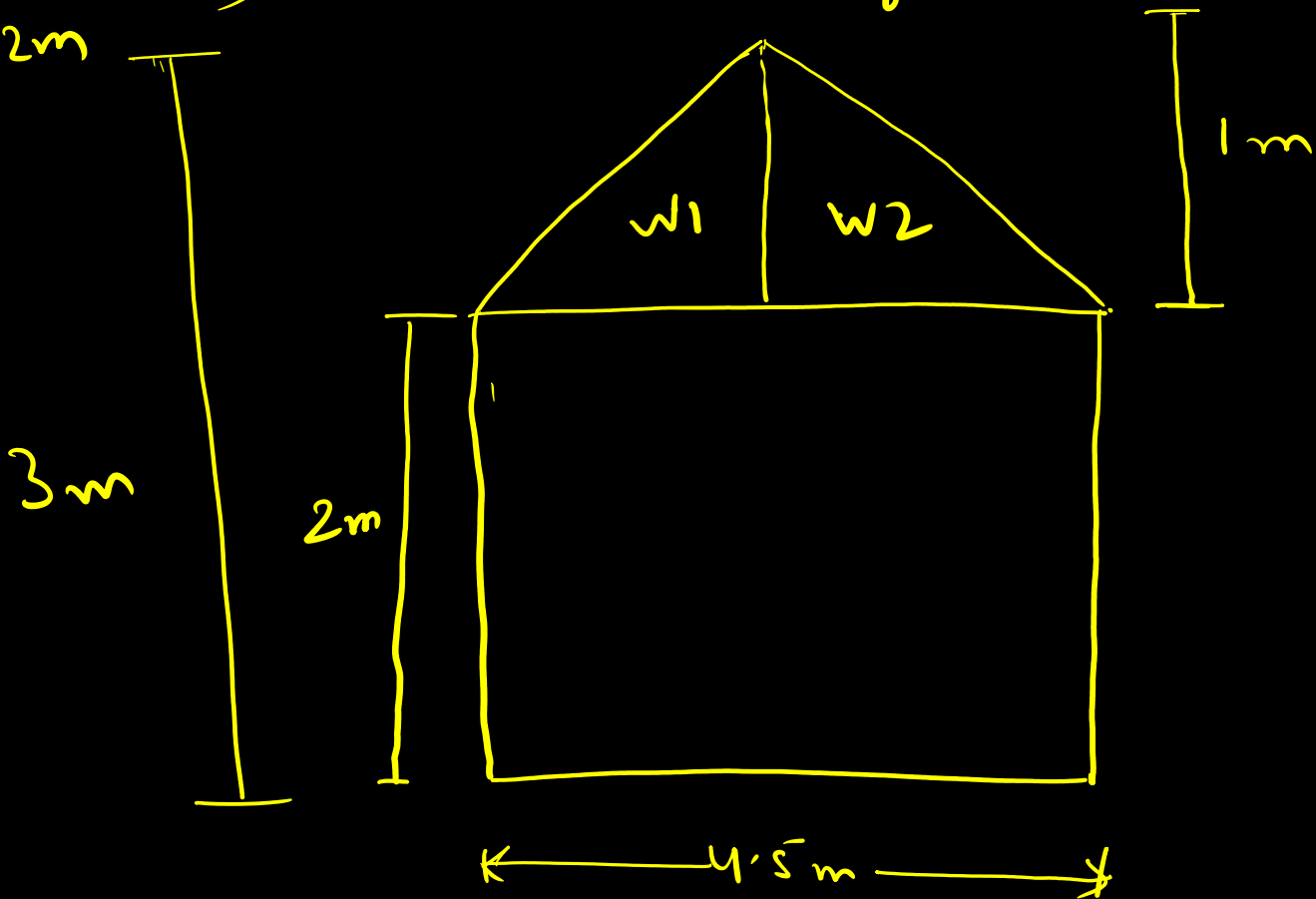
$$13^2 = 169$$

1. A wall is 4.5 long. and 3m high. It has two equal windows as shown in the fig. Find the cost of painting the wall (leaving the windows) at the rate of ₹15/m².

• width of the wall = $(3-1) = 2\text{m}$

• Area of wall without windows
= $2\text{m} \times 4.5\text{m}$
= _____ m²

• Cost of painting = 15×9
= ₹ 135



2. ABCD is a square, AD = 22 cm.
PQRC is another square, PC = y cm.

Area of shaded region = 403 cm².

Find the value of y.

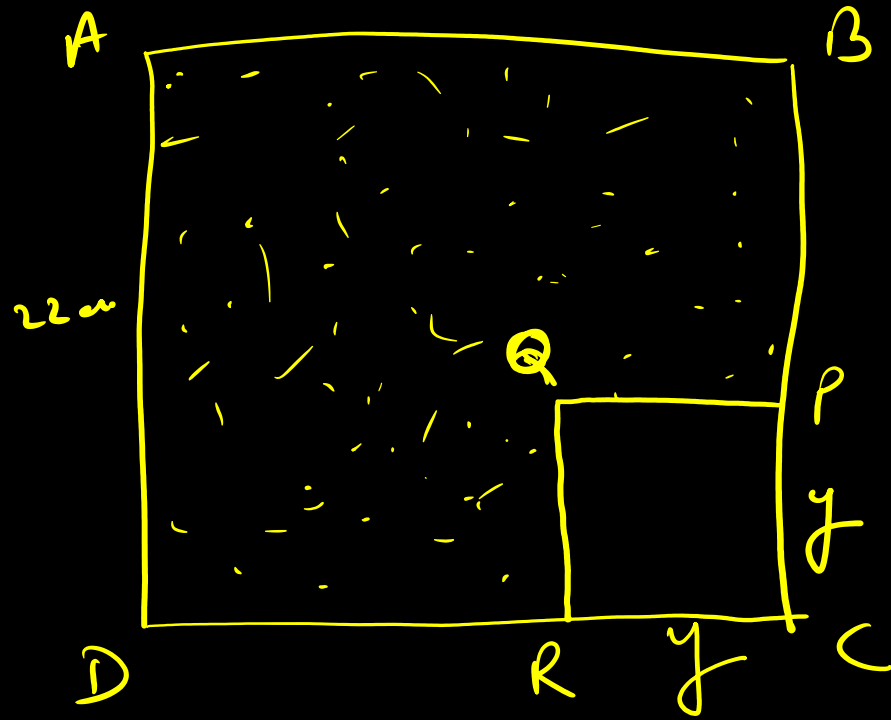
$$y \times y = 81$$

$$y^2 = 81$$

$$y = \sqrt{81}$$

$$= \sqrt{9 \times 9}$$

$$y = 9 \text{ cm}$$



3.

The length and breadth of a rectangle are $(3x+4)$ cm and $(4x-13)$ cm respectively. If the perimeter of the rectangle is 94 cm, find its area.

$$6x + 8 + 8x - 26 = 94$$

$$14x = 94 + 26 - 8$$

$$14x = 112$$

$$x = \frac{112}{14} = 8$$

$$\begin{aligned} \text{length} &= (3 \times 8 + 4) \\ &= 28 \text{ cm.} \end{aligned}$$

$$\text{width} = 4 \times 8 - 13 = 19 \text{ cm.}$$

$$\begin{aligned} \text{Area} &= 28 \times 19 \text{ cm} \\ &= \underline{\underline{532 \text{ cm}^2}} \quad \checkmark \end{aligned}$$

The length and breadth of a rectangle are in the ratio 3:2.
Its area is 216 cm², find its perimeter.

$$\begin{aligned} \text{length of rectangle} &= \underline{3x \text{ cm.}} \\ \text{width} &= \underline{2x \text{ cm.}} \end{aligned}$$

$$\underline{\text{Area of rectangle}} = 216 \text{ cm}^2$$

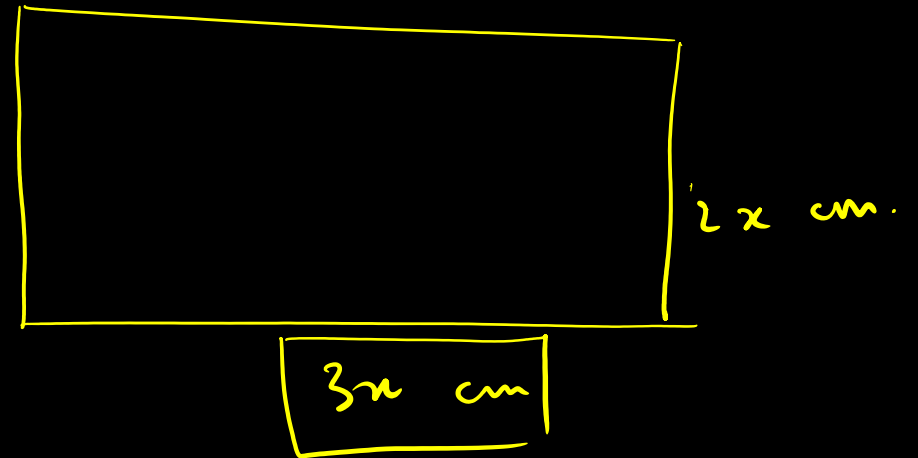
$$3x \times 2x = 216$$

$$6x^2 = 216$$

$$x^2 = \frac{216}{6} = 36$$

$$x^2 = 36$$

$$\begin{aligned} x &= \sqrt{36} \\ x &= \underline{6} \end{aligned}$$



$$\text{length} = 3 \times 6 = 18 \text{ cm.}$$

$$\text{breadth} = 2 \times 6 = 12 \text{ cm.}$$

$$\begin{aligned} \text{Perimeter} &= 2(l+w) = 2(30) \\ &= 60 \text{ cm} \end{aligned}$$

The area of rectangle 144 cm long is same as that of a square of side 84 cm. Find the width of the rectangle.

$$\left. \begin{array}{r} 1 \\ 2 \overline{) 3528} \\ \underline{-21} \\ 15 \end{array} \right\}$$

width: 49 cm

$$= \frac{144^2}{93} = \frac{49}{\cancel{147}} = 49$$

$$= \frac{3528}{72} = \frac{144}{\cancel{36}} = 49$$

$$= \frac{1764}{36} = 49$$

End of the chapter