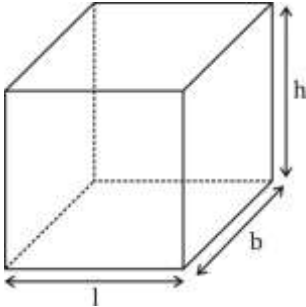


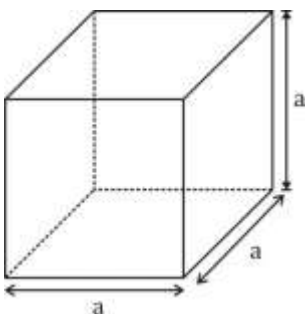
MENSURATION IMPORTANT POINTS AND FORMUAE

1. Cuboid



- Volume of cuboid = $l \times b \times h$
- Lateral surface Area = Perimeter of Base \times Height Base = $2(l + b) \times h$
- Total surface area = Lateral surface Area + $2 \times$ Area of base = $2(lh + bh + lb)$
- Diagonal = $\sqrt{l^2 + b^2 + h^2}$
- $V = \sqrt{A_1 \times A_2 \times A_3}$
 $A_1 \Rightarrow$ Area of base or top = lb
 $A_2 \Rightarrow$ Area of one side face = bh
 $A_3 \Rightarrow$ Area of another side face = hl
- To find the total surface area of a cuboid if the sum of all three sides and diagonals are given.
 Total surface area = $(\text{sum of all three side})^2 - (\text{Diagonal})^2$
- For painting the surface area of a box or to know how much tin sheet is required, we will use, Total surface area.
- To find the length of the longest pole to be placed in a room, we will calculate diagonal i.e. $\sqrt{l^2 + b^2 + h^2}$

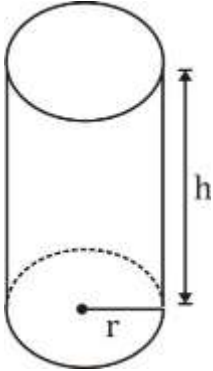
2. Cube



- Volume = $(\text{side})^3 = a^3$
- Lateral surface area = $4a^2$
- Total surface area = $6a^2$
- Diagonal of the cube = $\sqrt{3} a$
- Face diagonal of the cube = $\sqrt{2}a$

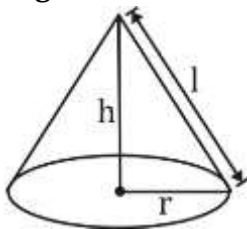
- Volume of cube = $\left(\sqrt{\frac{\text{total surface area}}{6}}\right)^3$
- In Radius of cube = $\frac{a}{2}$
- Circumradius of cube = $\frac{\sqrt{3}}{2} a$

3. Right circular cylinder:



- Volume = Area of base \times height = $\pi r^2 h$
- Lateral/curved surface Area = Perimeter of base \times height = $2\pi r h$.
- Total surface area = C.S.A + 2 \times Area of one circular end = $2\pi r(h + r)$

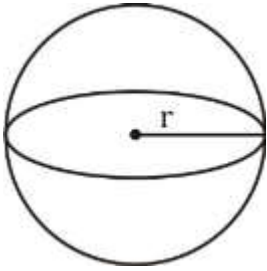
4. Right circular cone



- Slant height, $l = \sqrt{r^2 + h^2}$
- Volume = $\frac{1}{3} \times$ area of base \times height = $\frac{1}{3} \pi r^2 h$
- Curved surface area = $\frac{1}{2}$ (Perimeter of base) \times slant height
 $= \frac{1}{2} \times 2\pi r \times l = \pi r l = \pi r \sqrt{r^2 + h^2}$
- Total surface area = C.S.A + Area of base
 $= \pi r l + \pi r^2 = \pi r(l + r)$
- If cone is formed by sector of a circle then.
 - Slant height = radius of circle
 - circumference of base of cone = length of arc of sector
- Radius of maximum size sphere in a cone

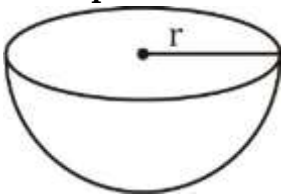
$$= \frac{h \times r}{l + r} \quad \left[\begin{array}{l} r \rightarrow \text{radius of cone} \\ l \rightarrow \text{slant height of cone} \\ h \rightarrow \text{height of cone} \end{array} \right]$$
- If cone is cut parallel to its base and ratio of heights, radius or slant height of both parts is given as $\rightarrow x : y$.
 Then Ratio of there volume = $x^3 : y^3$

5. Sphere



- Volume of sphere = $\frac{4}{3} \pi r^3$
- Surface area of sphere = $4\pi r^2$.
- If a sphere is cut into n parts, then T.S.A of n parts = $4\pi r^2 + n\pi r^2$
- For a spherical shell if R and r are outer and inner radii, Respectively, Then volume of a shell is = $\frac{4}{3} \pi (R^3 - r^3)$.

6. Hemisphere



- Volume of hemisphere = $\frac{2}{3} \pi r^3$
- Curved surface area = $2\pi r^2$
- Total surface Area = $3\pi r^2$