

Surface areas and volumes - Points to Remember

1. Cuboid:

- If l, b and h denote respectively the length, breadth, and height of a cuboid, then
- (i) Total surface area of the cuboid = 2(lb+bh+lh) square units.
- (ii) Volume of the cuboid= Area of the base \times height =lbh cubic units.
- (iii) Diagonal of the cuboid =12+b2+h2 units.
- (iv) Area of four walls of a room =2(l+b)h sq. units.

2. Cube:

- If the length of each edge of a cube is a units, then
- (i) Total surface area of the cube =6a2 sq. units
- (ii) Volume of the cube =a3 cubic units
- (iii) Diagonal of the cube =3a units

3. Solid Cylinder:

- If r and h denote respectively the radius of the base and height of a right circular cylinder, then
- (i) Area of each end $=\pi r^2$ sq. units
- (ii) Curved surface area $=2\pi rh$ sq. units
- (iii) Total surface area $=2\pi r(h+r)$ sq. units
- (iv) Volume = πr^2h = Area of the base × height

4. Hollow Cylinder:

- If R and r denote respectively the external and internal radii of a hollow right circular cylinder, then
- (i) Area of each end $=\pi R2$ -r2 sq. units
- (ii) Curved surface area of hollow cylinder = $2\pi(R+r)h$ sq. units
- (iii) Total surface area = $2\pi(R+r)(R+h-r)$ sq. units
- (iv) Volume of material $=\pi hR2$ -r2 cubic units

5. Cone:

If r, h and l denote respectively the radius of the base, height, and slant height of a right circular cone, then

(i) 12=r2+h2

- (ii) Curved surface area $=\pi rl$ sq. units
- (iii) Total surface area $=\pi r^2 + \pi r^2 sq$. units
- (iv) Volume = $13\pi r^2h$ cubic units

6. Sphere:

For a sphere of radius r, we have

(i) Surface area = $4\pi r^2$ sq. units



(ii) Volume = $43\pi r3$ cubic units

7. Frustum of a Cone:

- If h is the height, I the slant height and r1 and r2 the radii of the circular bases of a frustum of a cone, then
- (i) Volume of the frustum $=\pi 3r12 + r1r2 + r22h$ cubic units
- (ii) Lateral surface area $=\pi(r1+r2)l$ sq. units
- (iii) Total surface area $=\pi r1+r2l+r12+r22$ sq. units
- (iv) Slant height of the frustum =h2+r1-r22 units
- (iv) Height of the cone of which the frustum is a part =hr1r1-r2 units
- (v) Slant height of the cone of which the frustum is a part =lr1r1-r2 units
- 8. The volume of the frustum =h3A1+A2+A1A2, where A1 and A2 denote the areas of circular bases of the frustum.
- 9. The volume of the solid formed by joining two or more basic solids is the sum of the volumes of the constituents.

10. In calculating the surface area of a combination of solids, we can not add the surface area of the two constituents because some parts of the surface area disappear on joining them.