

CLASS 10

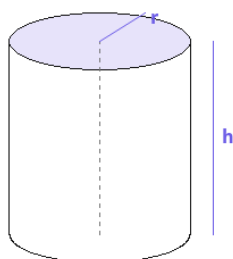
MATHS

REVISION NOTES

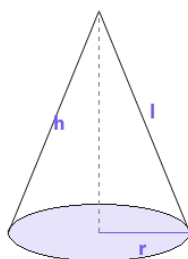
Class 10 Maths Chapter 12 Surface Areas and Volumes Revision Notes

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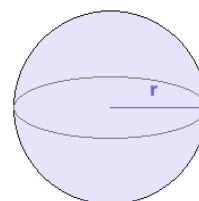
Cylinder



Cone



Sphere



CSA / TSA / Volume formulas for each solid are given above -- this figure just shows what r (radius), h (height) and l (slant height) refer to.

Reference figure — solids covered in this chapter (cylinder, cone, sphere)

- **Chapter scope (2026-27 book):** only 2 exercises — 12.1 (Surface Area of Combination of Solids), 12.2 (Volume of Combination of Solids). No Exercise 12.3.
- **Golden rule for combination surface area:** when two solids are joined, the surface where they meet is hidden — never add both solids' full surface areas; add only the curved/visible parts.
- **Golden rule for combination volume:** volumes simply add (or subtract, for carved-out cavities) — no hidden-surface adjustment needed for volume.
- Cube: $TSA = 6a^2$, $Volume = a^3$
- Cuboid: $TSA = 2(lb+bh+hl)$, $Volume = lbh$
- Cylinder: $CSA = 2\pi rh$, $TSA = 2\pi r(r+h)$, $Volume = \pi r^2 h$
- Cone: $CSA = \pi rl$, $TSA = \pi r(l+r)$, $Volume = (1/3)\pi r^2 h$, where $l = \sqrt{r^2 + h^2}$
- Sphere: $SA = 4\pi r^2$, $Volume = (4/3)\pi r^3$
- Hemisphere: $CSA = 2\pi r^2$, $TSA = 3\pi r^2$, $Volume = (2/3)\pi r^3$
- **Cone + hemisphere (same radius) toy:** $TSA = \pi r(l+2r)$; $Volume = (1/3)\pi r^2 h + (2/3)\pi r^3$
- **Cylinder + 2 hemispheres (capsule):** $TSA = 2\pi r(h_{cyl}+2r)$; $Volume = \pi r^2 h_{cyl} + (4/3)\pi r^3$
- **Cylinder with a cone hollowed out:** $TSA = CSA(\text{cylinder}) + \text{base circle} + CSA(\text{cone})$; $Volume = Volume(\text{cylinder}) - Volume(\text{cone})$
- **Melting-and-recasting problems:** always conserve volume, never surface area, when reshaping one solid into another.
- **Common error to avoid:** forgetting to subtract $2r$ (diameter) from total height when a hemisphere/sphere is attached at both ends of a cylinder, before computing the cylinder's own height.

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