CLASS 10 • MATHS REVISION • 2026–27

Surface Areas and Volumes

Sketch the solid and mark the joined surfaces. Volumes add for joined solids; surface areas require counting only the exposed surfaces.

Formulas and methods

Cuboid: $V = lbh$; total surface area $= 2(lb + bh + hl)$. Cube: $V = a^3$; total surface area $= 6a^2$.

Cylinder: $V = \pi r^2 h$; curved area $= 2\pi rh$; total area $= 2\pi r(h+r)$.

Cone: $V = \pi r^2 h/3$; slant height $s = \sqrt{(r^2+h^2)}$; curved area $= \pi rs$; total area $= \pi r(s+r)$.

Sphere: $V = 4\pi r^3/3$; area $= 4\pi r^2$. Hemisphere: $V = 2\pi r^3/3$; curved area $= 2\pi r^2$; total area $= 3\pi r^2$.

Worked examples

A cone has radius 3 cm and height 4 cm. Find its curved area and volume.

Slant height $s = \sqrt{(9+16)} = 5$ cm. Curved area $= \pi \times 3 \times 5 = 15\pi$ cm^2. Volume $= \pi \times 9 \times 4/3 = 12\pi$ cm^3.

A hemisphere of radius 3 cm sits on a cylinder of the same radius and height 7 cm. Find the exposed area, including the bottom.

Count cylinder curved area, hemisphere curved area, and cylinder bottom. Area $= 2\pi \times 3 \times 7 + 2\pi \times 9 + \pi \times 9 = 69\pi$ cm^2. The shared circular face is internal and is not counted.

Common mistake

Cone surface area uses slant height, but volume uses perpendicular height. Convert all lengths to one unit before calculating.

Surface Areas and Volumes — practice

Try these without looking at the answers. Show substitutions and units. Difficulty labels describe these questions, not official CBSE classifications.

1. [Foundation] Find the volume of a cuboid 4 cm by 5 cm by 6 cm.

2. [Core] Find the total surface area of a hemisphere of radius 7 cm using $\pi = 22/7$.

3. [Core] A cylinder has radius 2 cm and height 9 cm. Find its volume.

4. [Challenge] A cone of radius 3 cm and height 4 cm is joined to a hemisphere of radius 3 cm. Find the combined volume.

Surface Areas and Volumes — answers

1. Find the volume of a cuboid 4 cm by 5 cm by 6 cm.

$4\times5\times6 = 120$ cm³.

2. Find the total surface area of a hemisphere of radius 7 cm using $\pi = 22/7$.

$3\pi r^2 = 3\times(22/7)\times49 = 462$ cm².

3. A cylinder has radius 2 cm and height 9 cm. Find its volume.

$\pi\times4\times9 = 36\pi$ cm³.

4. A cone of radius 3 cm and height 4 cm is joined to a hemisphere of radius 3 cm. Find the combined volume.

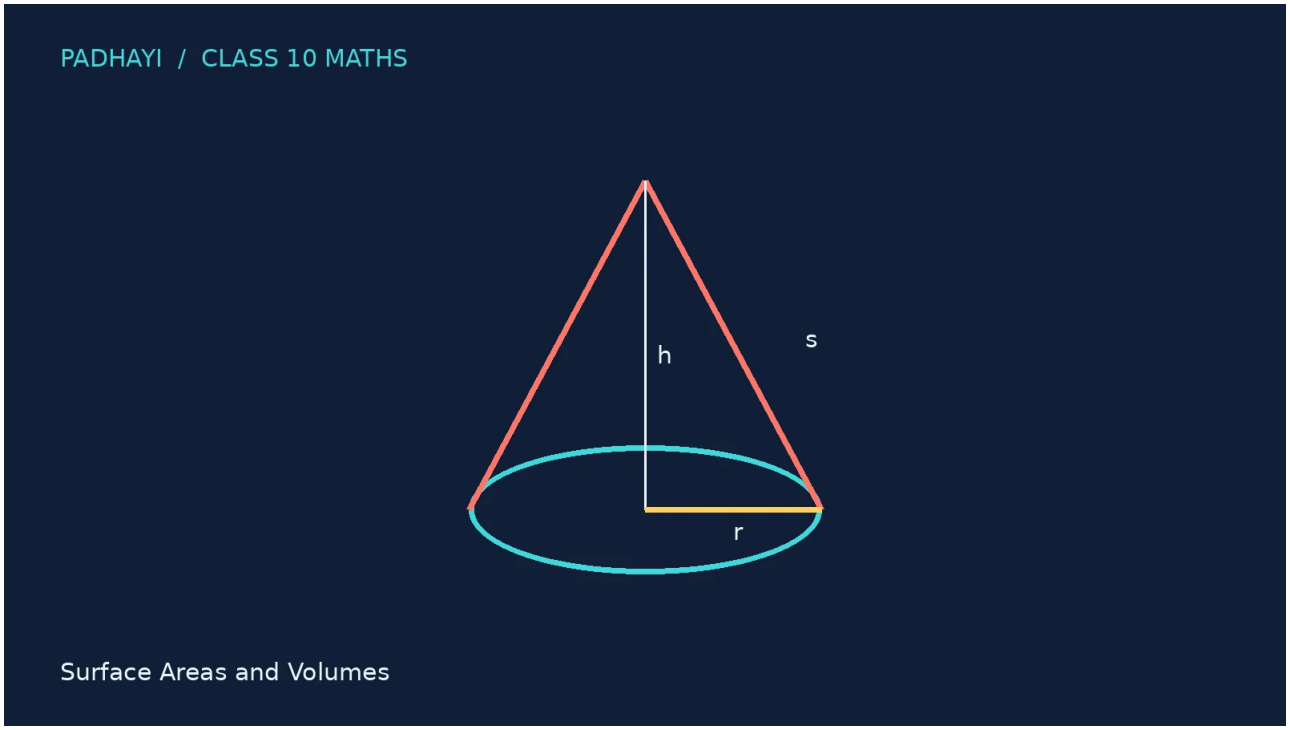
Cone volume = 12π; hemisphere volume = $(2/3)\pi\times27 = 18\pi$. Total = 30π cm³.

Next step: explain one method aloud, then solve a question from your NCERT textbook without using this sheet.

Original Padhayi revision material. Independent study aid; not an official CBSE or NCERT publication. Syllabus reference: CBSE Mathematics, Class X, 2026–27.

Official CBSE syllabus | NCERT textbooks

Visual reminder



Schematic illustration; diagrams are not necessarily drawn to scale.