

# Volume of Combined Solids and Conversion

Chapter 12: Surface Areas and Volumes · Topic 2

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## Key Concept

For example, if a metallic sphere is melted and recast into a cylinder, the sphere's original volume  $[(4/3)\pi r^3]$  must equal the cylinder's new volume  $(\pi R^2 h)$ , allowing the cylinder's height to be calculated if its radius is known, or vice versa. This 'conservation of volume' principle during melting and recasting is a common and important problem type, testing both volume formula knowledge and algebraic equation-solving skills together.

## Quick Revision Notes

- Combined solid volume = sum of the volumes of its individual parts.
- Unlike surface area, no surfaces are excluded when calculating combined volume.
- When a solid is melted and recast, its volume remains the same (conservation of volume).
- Example: sphere volume = cylinder volume, when melted sphere is recast into a cylinder.

## Practice Questions

- 1 A metallic sphere is melted and recast into a cylinder. If volumes are equal, set up the equation to find the cylinder's height.
- 2 Find the total volume of a solid combining a cone (radius 3cm, height 4cm) and a cylinder (same radius, height 6cm).
- 3 Explain why volume is conserved when a solid is melted and recast, but surface area generally is not.