Guide to:
Spheres and cones

maths Links

Explanation:

For a **sphere** of radius **r**: **Volume =** $\frac{4}{3}\pi r^3$ and **Surface Area =** $4\pi r^2$. For a **hemisphere**, halve the volume ($\frac{2}{3}\pi r^3$) and add the flat circular base for total surface area ($2\pi r^2 + \pi r^2 =$ **$3\pi r^2$**).

For a **cone** of radius **r**, perpendicular height **h**, and slant height **l**: **Volume =** $\frac{1}{3}\pi r^2 h$ and **Total Surface Area =** $\pi rl + \pi r^2$. Use Pythagoras ($l^2 = r^2 + h^2$) to switch between **h** and **l**.

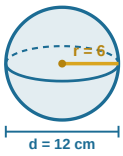
Example 1: Find the volume of a sphere with diameter **12 cm**. Give your answer in terms of π and to 3 s.f.

Solution:

Radius r = 12 ÷ 2 = **6 cm**

V = $\frac{4}{3}\pi(6^3)$ = **288π cm^3**

Ans: 288π (905 cm^3)



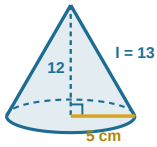
Example 2: A solid cone has base radius **5 cm** and vertical height **12 cm**. Find its total surface area in terms of π.

Solution:

l = $\sqrt{(5^2 + 12^2)}$ = **13 cm**

Curved = π(5)(13) = **65π**

Total = 65π + 25π = **90π cm^2**



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