

Volumes of Cones & Spheres

You are given on front page of exam:
 Volume of sphere = $\frac{4}{3}\pi r^3$
 Volume of cone = $\frac{1}{3}\pi r^2 h$

①

The volume of a sphere is 296 cm^3 . Calculate the radius of the sphere, giving your answer to an appropriate degree of accuracy.

$$V = \frac{4}{3}\pi r^3$$

$$296 \times 3 = 4\pi r^3$$

$$r^3 = \frac{296 \times 3}{4\pi}$$

$$r = \sqrt[3]{\frac{296 \times 3}{4\pi}} = 8.9 \text{ cm}$$

[2]

②

The volume of a hemisphere is $7\pi \text{ cm}^3$. Calculate the radius of the hemisphere.

$$\text{Vol of hemisphere} = 7\pi$$

$$\text{So Vol of sphere} = 7\pi \times 2 = 14\pi$$

$$14\pi = \frac{4}{3}\pi r^3$$

$$14\pi \times 3 = 4\pi r^3$$

$$r^3 = \frac{14\pi \times 3}{4\pi} = 10.5$$

$$r = \sqrt[3]{10.5} = 2.2 \text{ cm}$$

[4]

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③

A hemisphere is attached to a cone to make a solid as shown below.

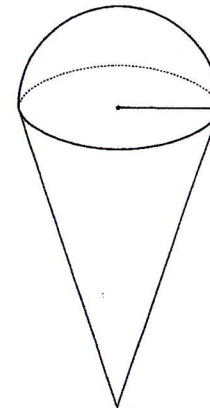


Diagram not drawn to scale.

The hemisphere has radius 1.8 cm. The cone has base radius 1.8 cm and height 5.1 cm. Calculate the volume of the solid.

$$\text{Vol of sphere} = \frac{4}{3}\pi \times 1.8^3 = 24.4$$

$$\text{Vol of hemisphere} = 24.4 \div 2 = 12.2 \text{ cm}^3$$

$$\text{Vol of cone} = \frac{1}{3}\pi \times 1.8^2 \times 5.1 = 17.3 \text{ cm}^3$$

$$\therefore \text{Volume of solids} = 17.3 + 12.2 = 29.5 \text{ cm}^3$$

[4]

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