

Volume of a Sphere

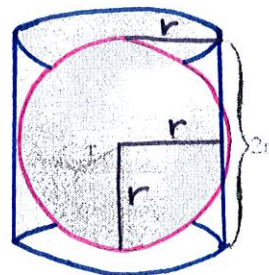
Big Idea: The volume of a sphere is $\frac{2}{3}$ the volume of a cylinder with the same radius.

Volume of a cylinder = $\pi r^2 h$

Let's find $\frac{2}{3}$ of a cylinder...

$$V = \frac{2\pi r^2 h}{3}$$

$$V = \frac{2\pi r^2 (2r)}{3} \Rightarrow V = \frac{4\pi r^3}{3}$$



height of a cylinder surrounding a sphere is 2 radii (radiuses)

Example:

Find the volume:

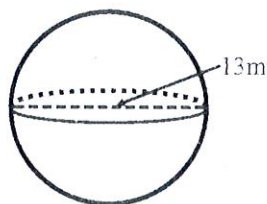
$$V = \frac{4\pi r^3}{3}$$

$$V = \frac{4\pi 6.5^3}{3}$$

$$V = \frac{274.625 \cdot 4 \cdot \pi}{3}$$

$$V = \frac{1098.5\pi}{3}$$

$$V = 366.1\bar{6}\pi m^3 \text{ Exact } \quad \text{Approx } V \approx 1149.76\bar{3} m^3$$



a.

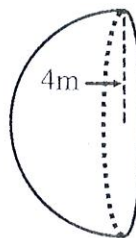
$$V = \frac{4\pi r^3}{3} \div 2$$

$$V = \frac{4\pi r^3}{6}$$

$$V = \frac{4\pi 4^3}{6}$$

$$V = \frac{4 \cdot 64 \cdot \pi}{6}$$

$$V = \frac{256\pi}{6}$$



Volume of a sphere = $\frac{4\pi r^3}{3}$

$$V = 42\frac{2}{3}\pi m^3 \text{ Exact } \quad V \approx 133.97\bar{3} m^3 \text{ Approx}$$