

## The Sphere (football, planet)

Given these  
in exam



$$\text{Volume} = \frac{4}{3}\pi r^3$$

$$\text{Surface Area} = 4\pi r^2$$

### Example

A basketball has diameter 30cm

Find its volume and surface area

$$\text{radius} = 15\text{cm}$$

$$\begin{aligned}\text{Vol} &= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times 15^3 \\ &= 4500\pi \\ &= 14,137\text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Surface Area} &= 4\pi r^2 = 4 \times \pi \times 15^2 \\ &= 900\pi \\ &= 2,827\text{ cm}^2\end{aligned}$$

Ex2 Find the volume and surface area  
of the Earth in  $\text{km}^3$  and  $\text{km}^2$  respectively

$$\text{Radius of Earth} = 6371\text{ km}$$

$$\begin{aligned}\text{Vol} &= \frac{4}{3} \times \pi \times 6371^3 = 1.08 \times 10^{12} \\ &= 1,080,000,000,000\text{ km}^3\end{aligned}$$

$$\begin{aligned}\text{Surface Area} &= 4 \times \pi \times 6371^2 \\ &= 510064472 \\ &= 510,000,000 \quad \text{to 3 s.f.}\end{aligned}$$

## Compound Shapes



Grain Silo    radius 6m  
height of cylinder 12m

Find volume

$$\begin{aligned}\pi r^2 h &+ \frac{2}{3} \pi r^3 \\ &= \pi \times 6^2 \times 12 + \frac{2}{3} \times \pi \times 6^3 \\ &= 576\pi \\ &= 1810 \text{ m}^3\end{aligned}$$

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Find surface area (excluding base on ground)

$$\begin{aligned}\text{Surface area} &2\pi r h + 2\pi r^2 \\ &= 2 \times \pi \times 6 \times 12 + 2 \times \pi \times 6^2 \\ &= 216\pi \\ &= 679 \text{ m}^2\end{aligned}$$

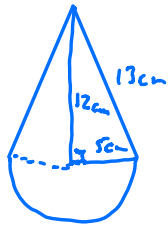
1 l of paint will cover  $8.2 \text{ m}^2$  and cost £3.25 per tin. How much will it cost for enough paint to paint the silo.

$$679 \div 8.2 = 82.8 \quad \text{so } 83 \text{ tins required}$$

$$83 \times £3.25 = £269.75$$

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## Homework



$$r = 5\text{cm}$$

$$h = 12\text{cm}$$

$$L = 13\text{cm}$$

Find volume and  
surface area

$$\text{Cone } V = \frac{1}{3}\pi r^2 h$$

$$\text{Curved surface area} = \pi r L$$

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

$$\text{Sphere surface area} = 4\pi r^2$$