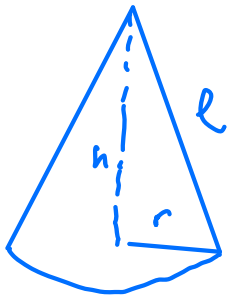


Volume and Surface Area

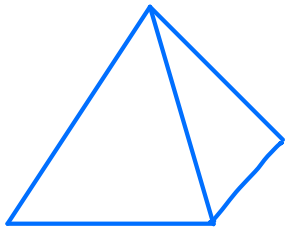
Cone



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

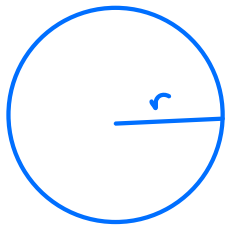
$$\text{Curved Surface Area} = \pi r l$$

Pyramid



$$\text{Volume} = \frac{1}{3} \text{Area of base} \times \text{height}$$

Sphere



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

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

Examples

- 1) Find the volume and surface area of a sphere with radius 12cm

$$\begin{aligned} \text{Vol} &= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 12^3 \\ &= 2304\pi = 7238 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Surface Area} &= 4\pi r^2 = 4 \times \pi \times 12^2 \\ &= 576\pi = 1810 \text{ cm}^2 \end{aligned}$$

ii) Find the volume and surface area of the Earth considering it to be a sphere of radius 6370 km

$$\begin{aligned} \text{Vol} &= \frac{4}{3} \pi \times 6370^3 \\ &= 1.08 \times 10^{12} \text{ km}^3 \\ &= 1.08 \times 10^{12} \times 10^9 \text{ m}^3 \\ &= 1.08 \times 10^{21} \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Surface Area} &= 4 \times \pi \times 6370^2 \\ &= 510000000 \text{ km}^2 \\ &= 5.1 \times 10^8 \text{ km}^2 \\ &= 5.1 \times 10^8 \times 10^6 \text{ m}^2 \\ &= 5.1 \times 10^{14} \text{ m}^2 \end{aligned}$$

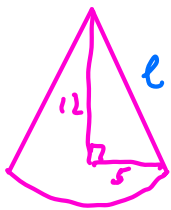
Ex3 A sphere has a volume of 1000 cm^3
Find its surface area

$$\begin{aligned} V &= \frac{4}{3} \pi r^3 \\ 3V &= 4\pi r^3 \\ \frac{3V}{4\pi} &= r^3 \\ \sqrt[3]{\frac{3V}{4\pi}} &= r \end{aligned}$$

$$r = \sqrt[3]{\frac{3000}{4\pi}} = 6.2035 \text{ cm}$$

$$\begin{aligned}\text{Surface Area} &= 4\pi r^2 \\ &= 4 \times \pi \times 6.2035^2 \text{ cm}^2 \\ &= 77.955 \\ &= 78.0 \text{ cm}^2\end{aligned}$$

Ex4 Find the Volume and total surface area of a solid cone radius 5cm, height 12cm

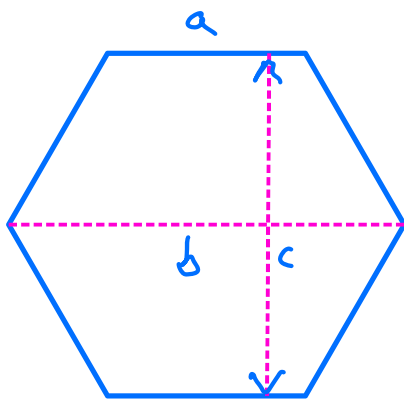


$$\begin{aligned}\text{Vol} &= \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times 5^2 \times 12 \\ &= 100\pi \\ &= 314 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}5^2 + 12^2 &= l^2 \\ l &= 13 \text{ cm}\end{aligned}$$

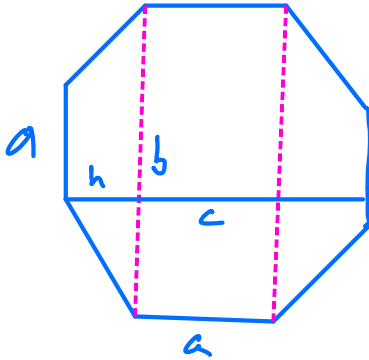
$$\begin{aligned}\text{Surface Area} &= \text{base} + \text{curved surface} \\ &= \pi r^2 + \pi r l \\ &= \pi \times 5^2 + \pi \times 5 \times 13 \\ &= 90\pi \\ &= 283 \text{ cm}^2\end{aligned}$$

Area of Hexagon and Octagon by Measuring



Measure a, b, c

Each trapezium has parallel sides a, b and height $\frac{c}{2}$



Measure a, b

height of trapezium

$$h = \frac{c - a}{2}$$

Octagon 2 trapeziums + Rectangle
