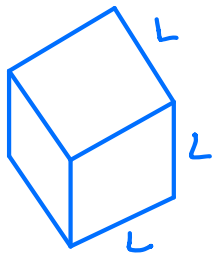
Cube

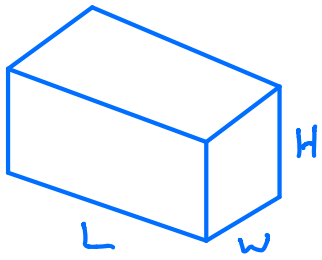


$$\text{Volume} = L \times L \times L = L^3$$

$$\text{Surface Area} = 6L^2$$

A cube has 6 faces
8 vertices
12 edges

Cuboid

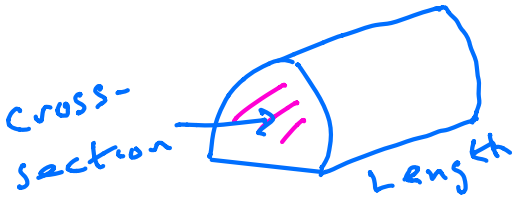


$$\text{Volume} = L \times W \times H$$

Surface Area

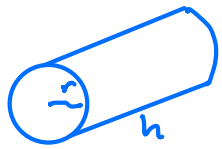
$$= 2LW + 2LH + 2WH$$

Prisms – have a uniform cross-section



Volume = Area of Cross-Section × Length

Cylinder



Volume $\pi r^2 h$

Curved Surface Area $= 2\pi r h$

Total surface area $= 2\pi r h + 2\pi r^2$

or $2\pi r(h + r)$

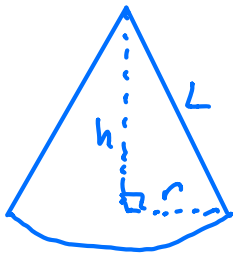
GIVEN ON EXAM PAPER

Sphere radius r

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

Surface Area $= 4\pi r^2$

Cone

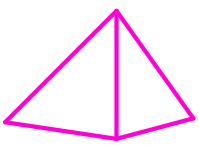


Volume $= \frac{1}{3}\pi r^2 h$

Curved Surface Area $= \pi r L$

Total Surface Area $= \pi r L + \pi r^2$

NOT GIVEN ON EXAM PAPER

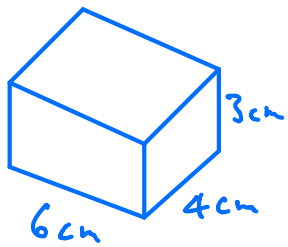


Pyramid

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

Examples

1)



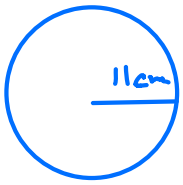
$$\text{Vol} = 6 \times 4 \times 3 = 72\,\text{cm}^3$$

Surface Area =

$$2 \times 6 \times 4 + 2 \times 6 \times 3 + 2 \times 4 \times 3$$
$$= 48 + 36 + 24$$
$$= 108\,\text{cm}^2$$

---

2)



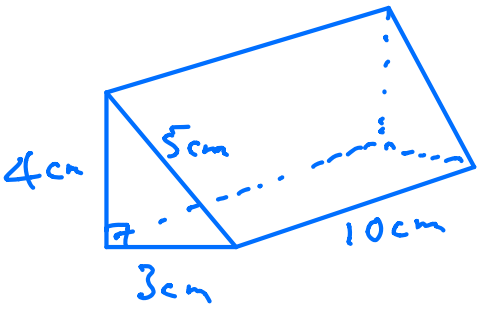
Sphere radius 11cm

$$\text{Vol} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 11^3 = 5575\,\text{cm}^3$$

$$\text{Surface Area} = 4\pi r^2$$
$$= 4\pi \times 11^2 = 1521\,\text{cm}^2$$

---

3)

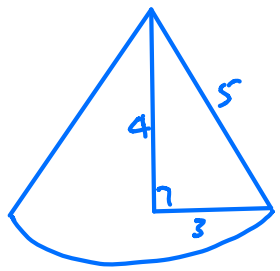


$$\text{Vol} = \text{Area of } \Delta \times \text{Length}$$
$$= \frac{1}{2} \times 3 \times 4 \times 10$$
$$= 60\,\text{cm}^2$$

Surface Area

Δ	$\frac{1}{2} \times 3 \times 4$	=	6
Δ		=	6
Front	10×5	=	50
Back	10×4	=	40
Bottom	10×3	=	30
			$132\,\text{cm}^2$

4)

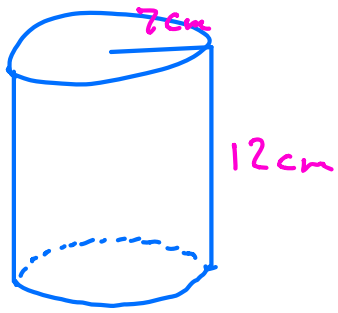


$$\text{Vol} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times 3^2 \times 4 \quad 37.7\ cm^3$$

$$\begin{aligned}
\text{Surface Area} &= \text{Curved Surface} + \text{Base} \\
&= \pi r L + \pi r^2 \\
&= \pi \times 3 \times 5 + \pi \times 3^2 \\
&= 75.4\ cm^2
\end{aligned}$$

---

5)



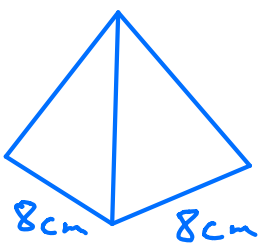
$$\text{Vol} = \pi r^2 h = \pi \times 7^2 \times 12$$
$$= 1847\ cm^3$$

$$\begin{aligned}
\text{Total surface area} &= \text{Curved surface} + \text{top and base} \\
&\quad 2\pi r h + \pi r^2 + \pi r^2
\end{aligned}$$

$$= 2 \times \pi \times 7 \times 12 + \pi \times 7^2 \times 2 = 836\ cm^2$$

---

6) Pyramid (square based)



height 10cm

$$\text{Vol} = \frac{1}{3} \times \text{base area} \times \text{height}$$
$$= \frac{1}{3} \times 8 \times 8 \times 10$$
$$= 213.3\ cm$$

Rearrange Sphere Volume Formula to find radius

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

$$3V = 4\pi r^3$$

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

$$\sqrt[3]{\frac{3V}{4\pi}} = r$$

If volume = 1 litre = 1000 cm^3 find r

$$r = \sqrt[3]{\frac{3 \times 1000}{(4\pi)}} = 6.20 \text{ cm}$$