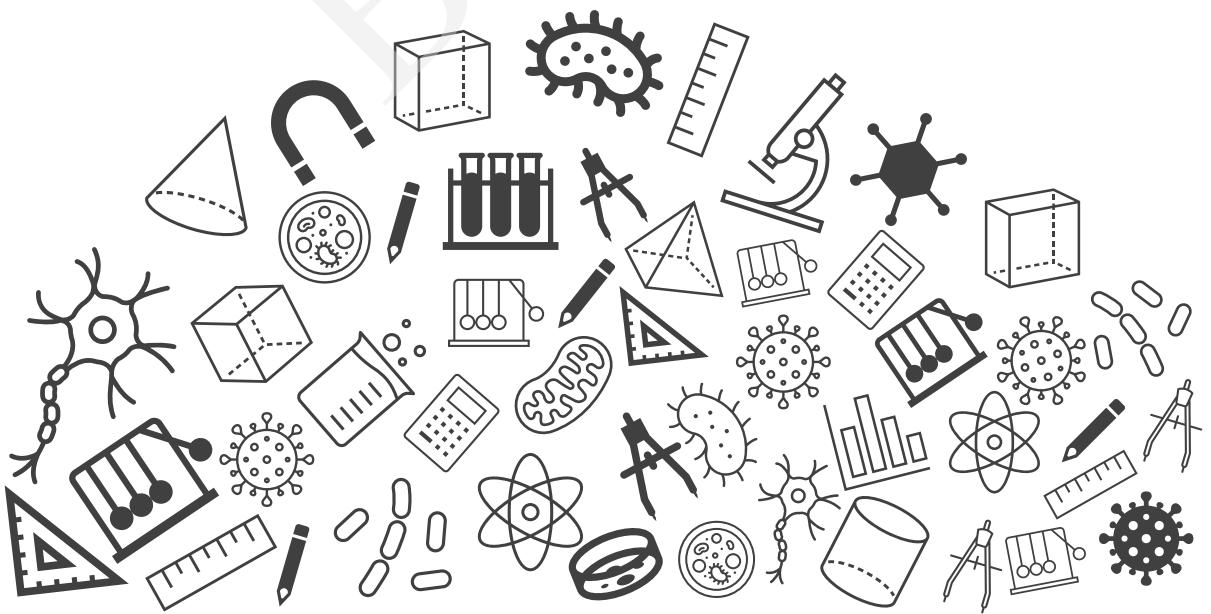




Grade 10

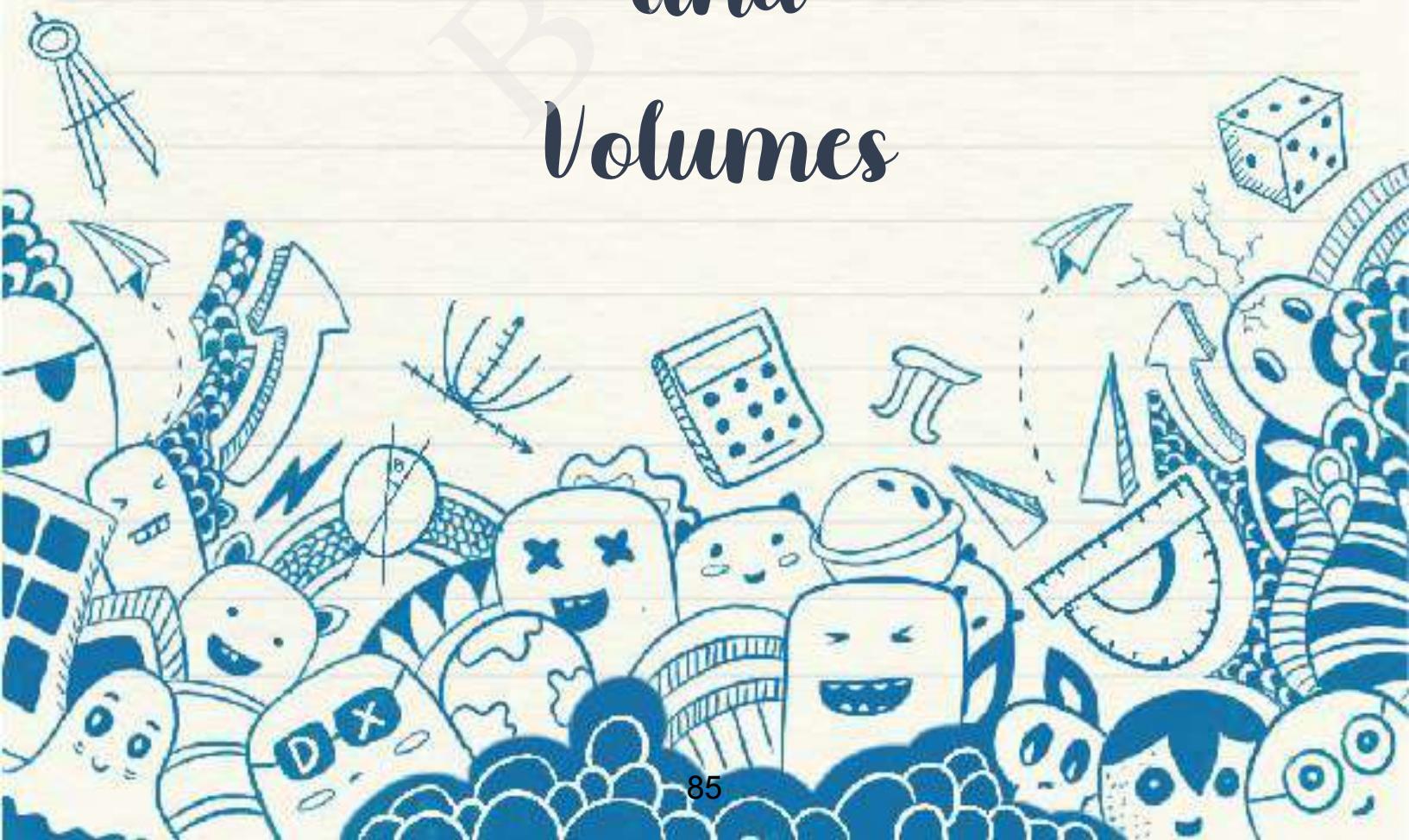
Mathematics Chapter Notes



M A T H E M A T I C S



Surface Areas and Volumes

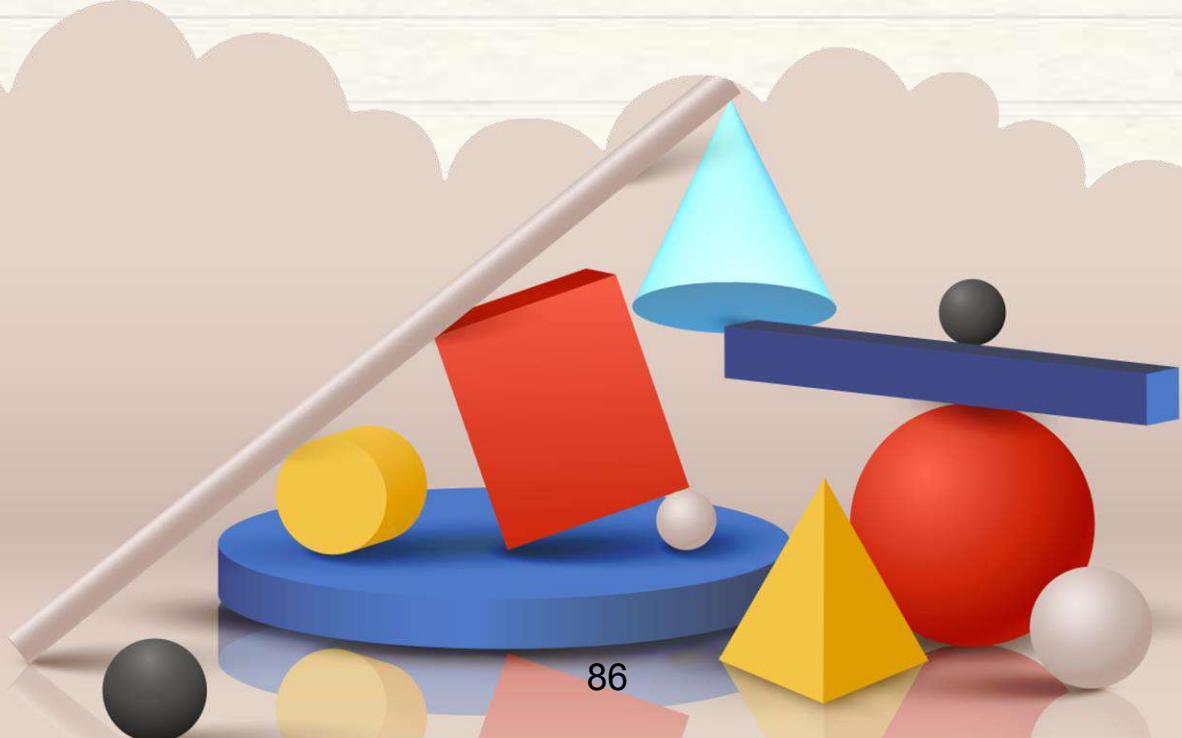




Topics to be Covered



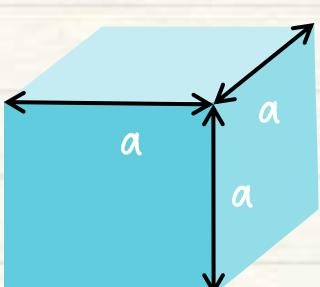
- 1. Formulae of Solids
- 2. Combination of Solids
- 3. Surface Area of Combined Solids
- 4. Volume of Combined Solids
- 5. Conversion of Solids



1. Formulae of Solids

Here are surface areas and volumes of few solids before we look at combined solids.

Cube



$$4a^2$$

: Lateral surface area

$$6a^2$$

: Total surface area

$$a^3$$

: Volume

Cuboid

Lateral surface area :

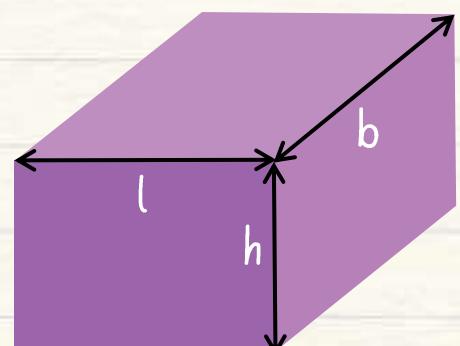
$$2h(l + b)$$

Total surface area :

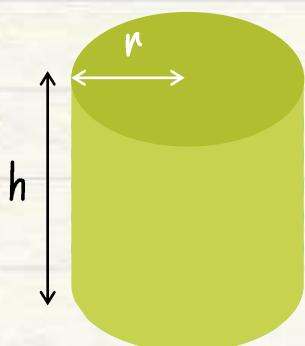
$$2(lb + bh + hl)$$

Volume :

$$lbh$$



Cylinder



$$2\pi rh$$

: Curved surface area

$$2\pi rh + 2\pi r^2$$

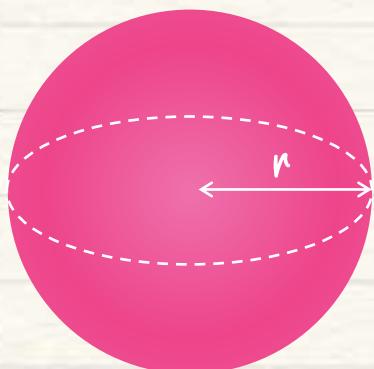
: Total surface area

$$\pi r^2 h$$

: Volume

1. Formulae of Solids

Sphere



$$4\pi r^2$$

: Curved surface area

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

: Volume

Hemisphere

Curved surface area :

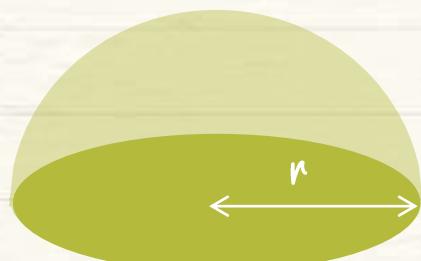
$$2\pi r^2$$

Total surface area :

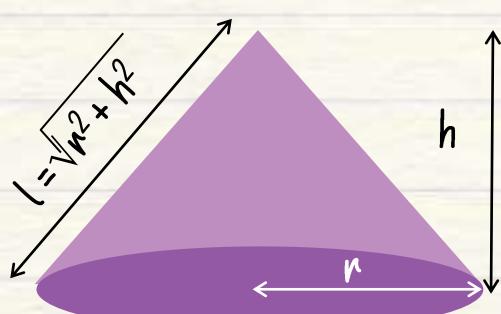
$$3\pi r^2$$

Volume :

$$\frac{2}{3}\pi r^3$$



Cone



$$\pi r l$$

: Curved surface area

$$\pi r l + \pi r^2$$

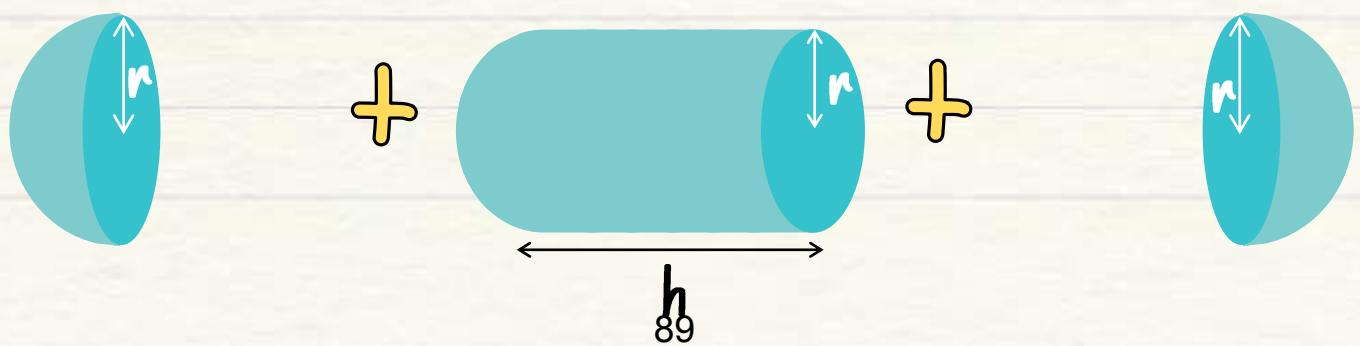
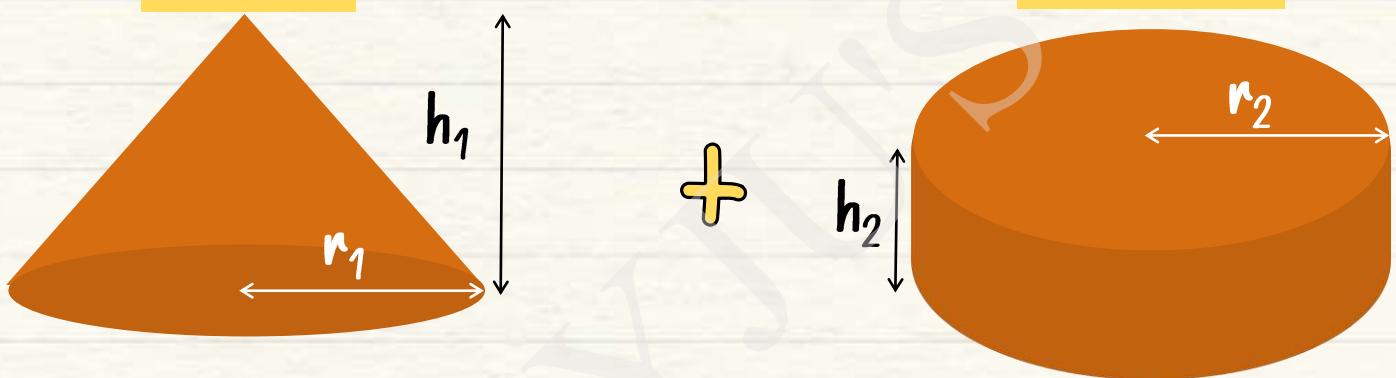
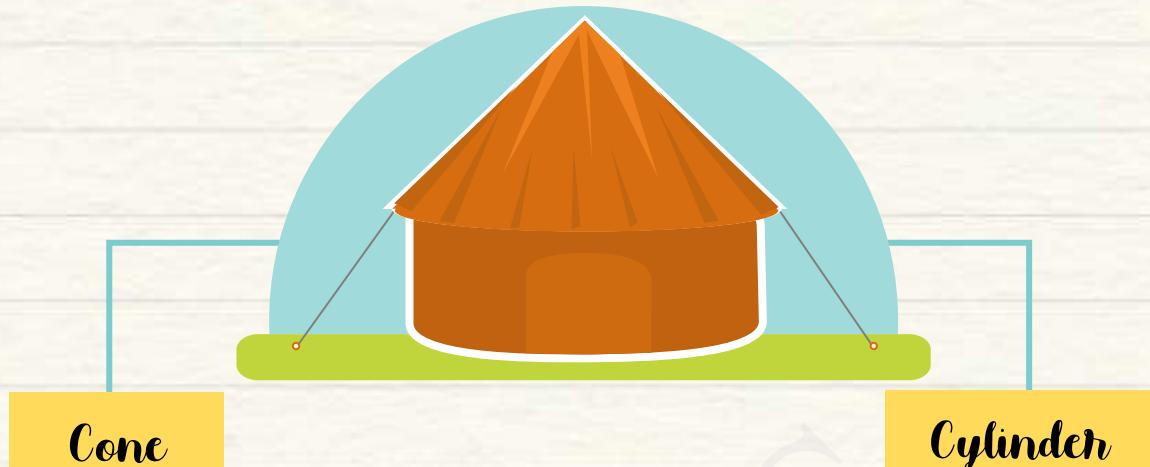
: Total surface area

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

: Volume

2. Combination of Solids

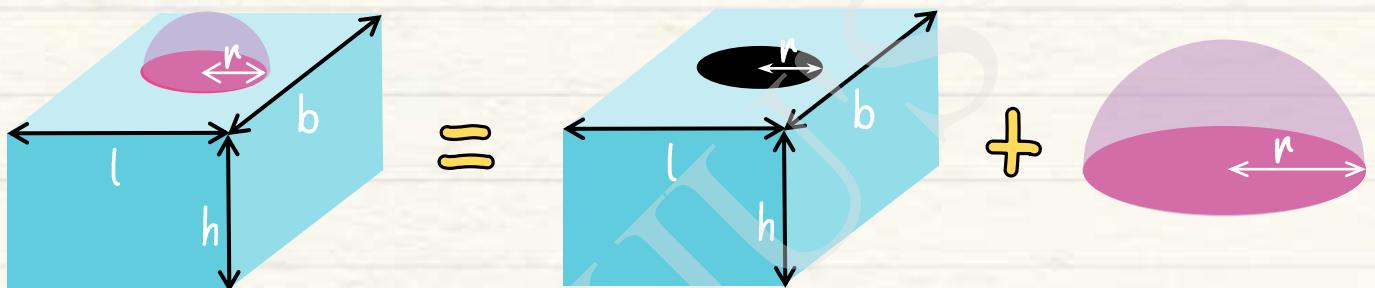
Shapes that are formed by combining two or more solids.



3. Surface Area of Combination of Solids

It is the sum of the surface areas of individual solid's visible portion, in the given combined solid.

Total Surface Area



Total surface area of the shape

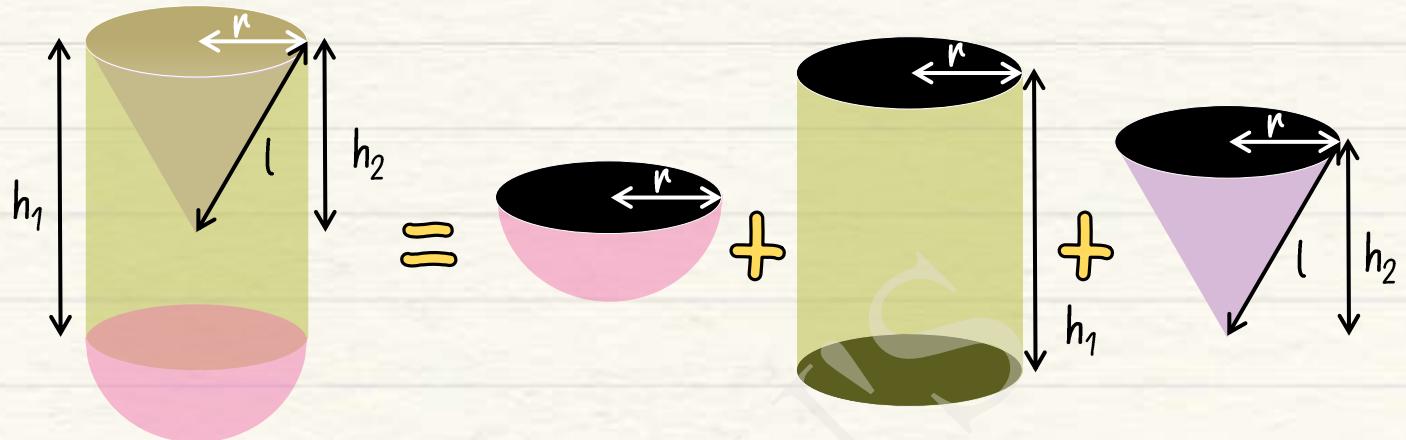
=

$$\left. \begin{array}{l} \text{Total surface area of cuboid} \\ + \text{Curved surface area of hemisphere} \\ - \text{Base area of hemisphere} \end{array} \right\}$$

$$2(lb + bh + hl) + 2\pi r^2 - \pi r^2$$

3. Surface Area of Combination of Solids

Total Surface Area



Total surface area of the shape

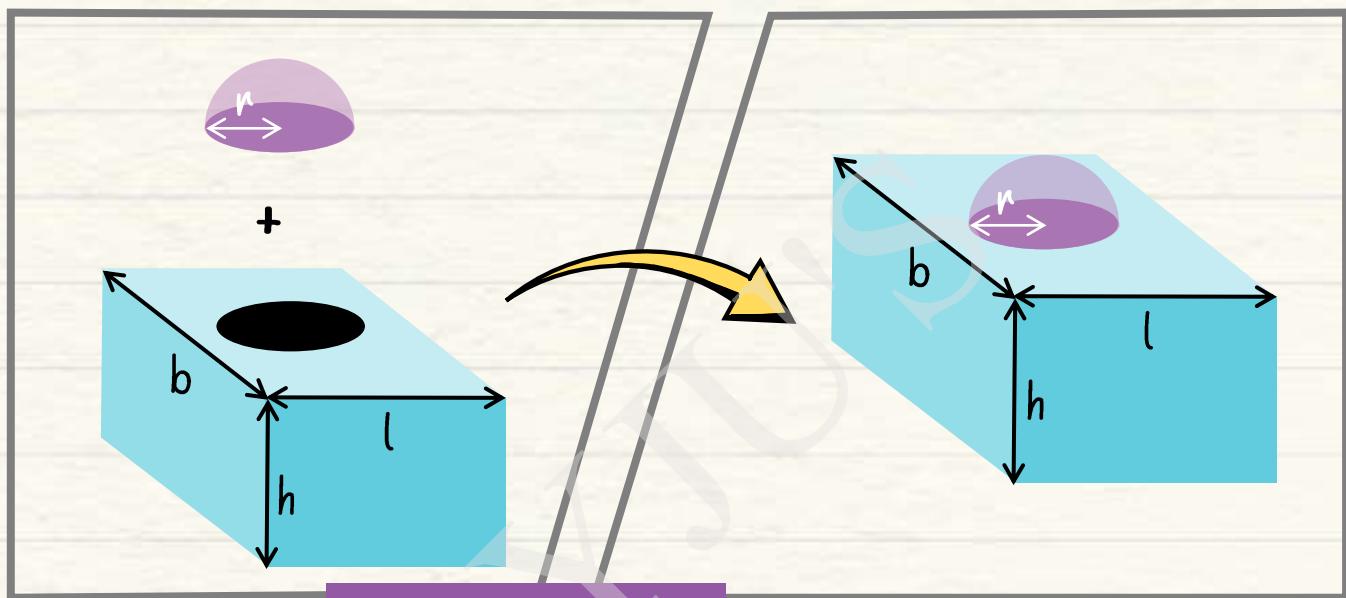
=

{ Curved surface area of hemisphere
 + Curved surface area of cylinder
 + Curved surface area of cone }

$$2\pi rh_1 + \pi rl + 2\pi r^2$$

4. Volume of Combination of Solids

It is the sum of the volumes of solids that are being combined, and subtraction of the volumes of the solids that are being removed.



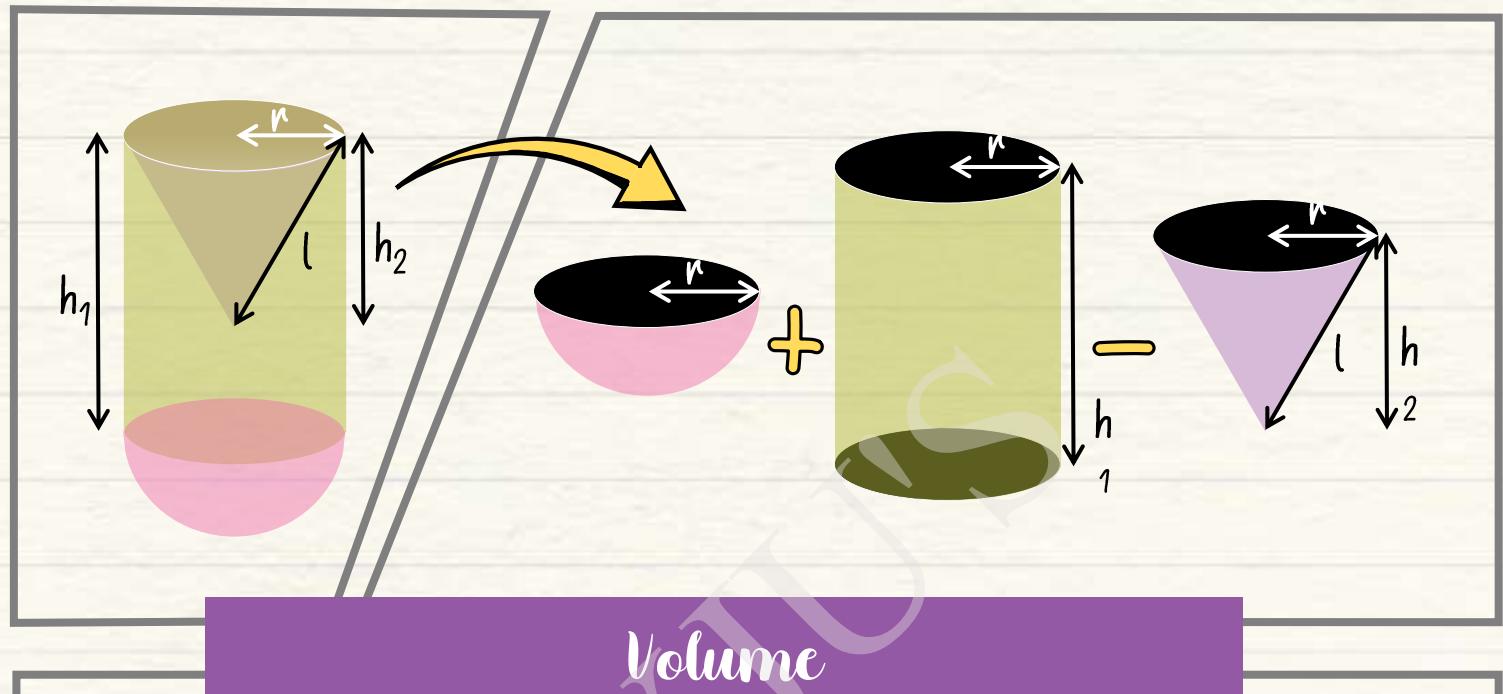
Volume of cuboid



Volume of hemisphere

$$lbh + \frac{2}{3} \pi r^3$$

4. Volume of Combination of Solids



Volume of the shape

=

$$\left. \begin{array}{c} \text{Volume of Cylinder} \\ + \text{Volume of hemisphere} \\ - \text{Volume of cone} \end{array} \right\}$$

$$\pi r^2 h_1 - \frac{1}{3} \pi r^2 h_2 + \frac{2}{3} \pi r^3$$



Mind Map

