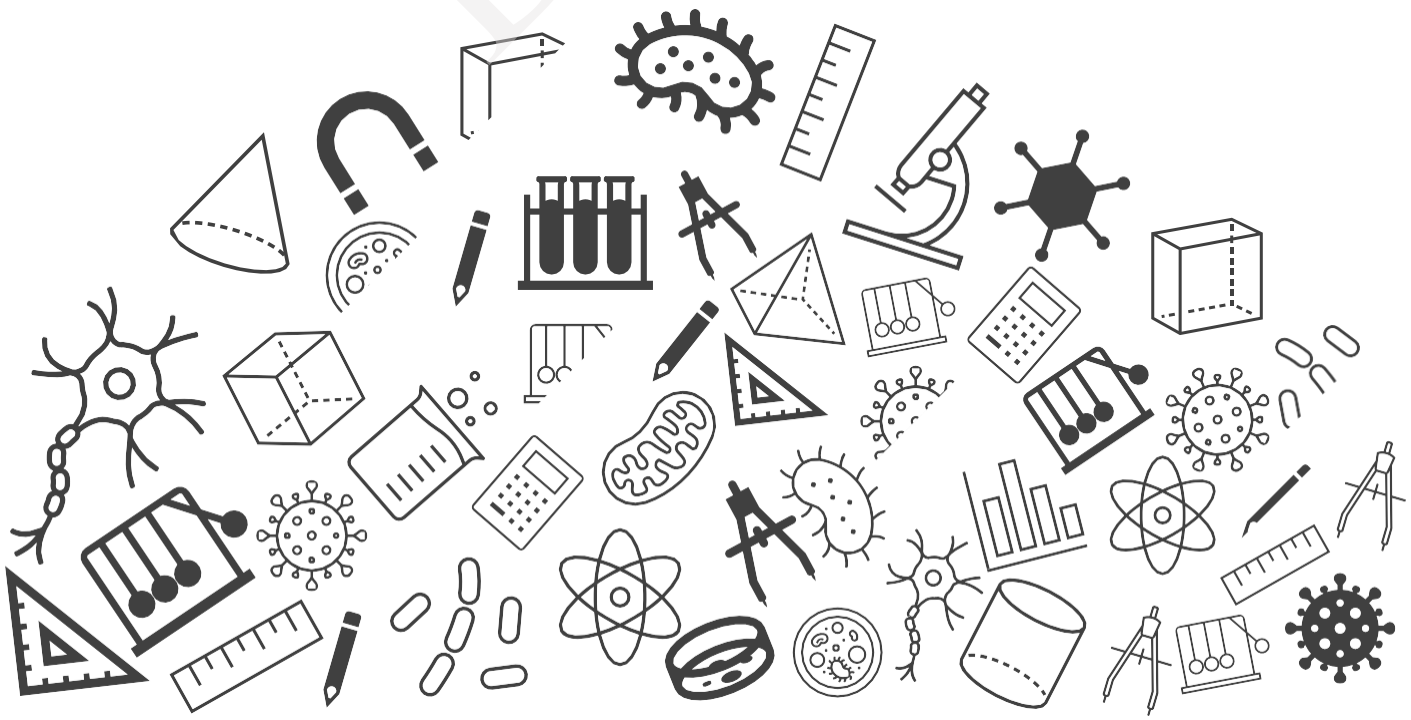
Grade 08
Maths Chapter Notes



BYJU'S Classes

Chapter Notes

Mensuration

Grade 08

Mensuration

1. Mensuration of 2D Shapes

- 1.1. Perimeter and Area of Basic Shapes
- 1.2. Area of a Trapezium
- 1.3. Area of a General Quadrilateral
- 1.4. Area of a Rhombus
- 1.5. Area of a Polygon

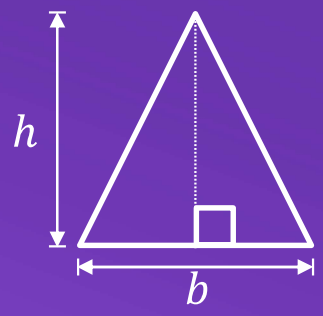
2. Mensuration of 3D Shapes

- 2.1. Surface Area
- 2.2. Volume

1. Mensuration of 2D Shapes

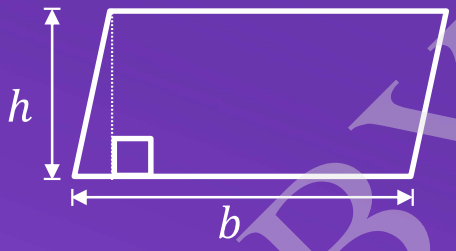
1.1. Perimeter and Area of Basic Shapes

Triangle



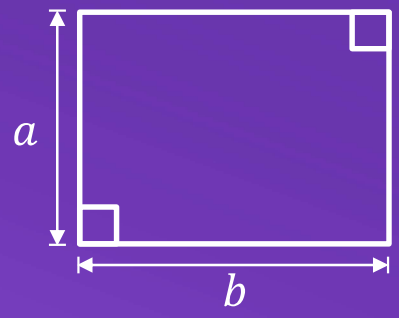
- Perimeter: Sum of all the three sides
- Area: $\frac{1}{2}bh$

Parallelogram



- Perimeter: Twice the sum of adjacent sides
- Area: bh

Rectangle

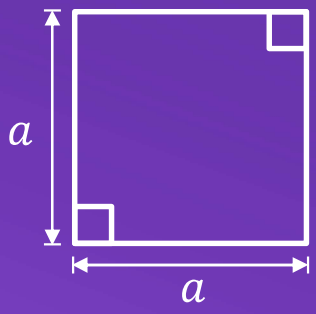


- Perimeter: $2(a + b)$
- Area: ab

1. Mensuration of 2D Shapes

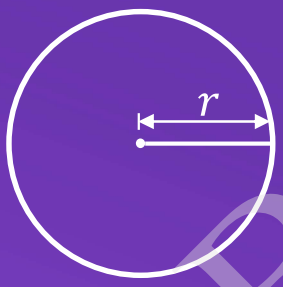
1.1. Perimeter and Area of Basic Shapes

Square



- Perimeter: $4a$
- Area: a^2

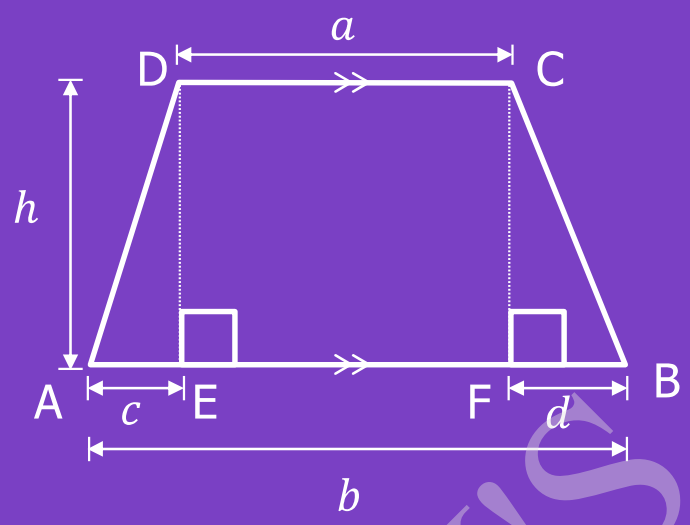
Circle



- Perimeter: $2\pi r$
- Area: πr^2

1. Mensuration of 2D Shapes

1.2. Area of a Trapezium



Consider a trapezium ABCD

Area of trapezium ABCD
= Area of △AED + Area of DEFC + Area of △CFB

$= \frac{1}{2}ch + ah + \frac{1}{2}dh$

$= \frac{1}{2}h(c + 2a + d)$

$= \frac{1}{2}h[(c + a + d) + a]$

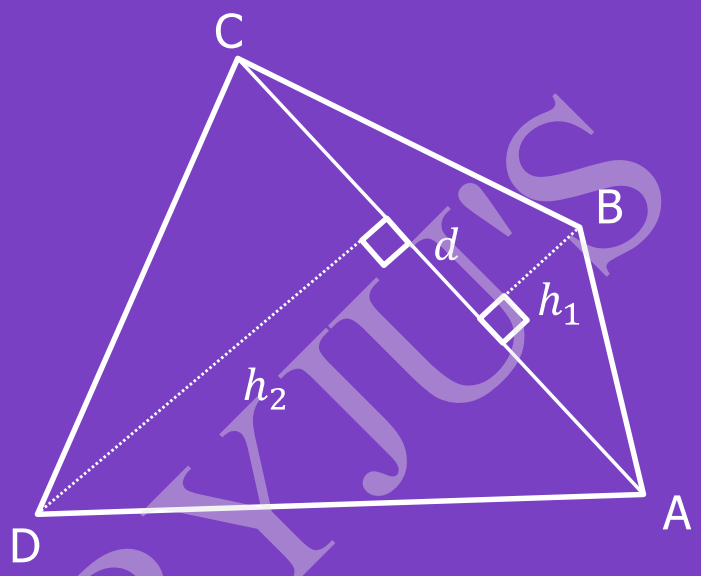
$= \frac{1}{2}h[a + b]$

Area of a trapezium
$= \frac{1}{2}$ × height × sum of two parallel sides

1. Mensuration of 2D Shapes

1.3. Area of a General Quadrilateral

- A general quadrilateral can be split into two triangles by drawing one of its diagonals.
- This triangulation helps us to find the formula for area any general quadrilateral.



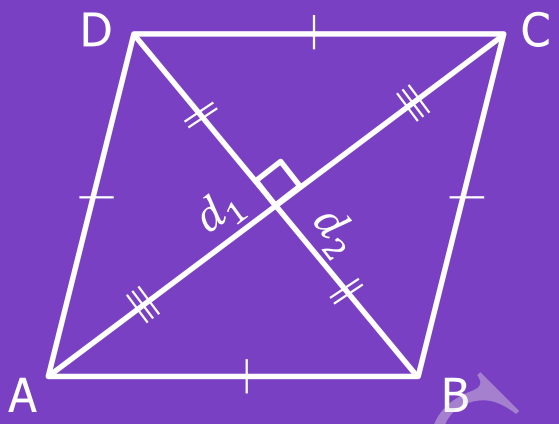
Consider a quadrilateral ABCD.
Here, d denotes the length of the diagonal AC. h_1 and h_2 are the length of the perpendiculars from point B and point D on AC, respectively.

Area of quadrilateral ABCD
= Area of △ABC + Area of △ADC

$= \frac{1}{2} h_1 d + \frac{1}{2} h_2 d$

$= \frac{1}{2} d(h_1 + h_2)$

1.4. Area of a Rhombus



Consider a rhombus ABCD.
Here, d_1 denotes the length of the longer diagonal AC and d_2 is the length of the shorter diagonal BD.

Area of rhombus ABCD
= Area of △ABC + Area of △ADC

$= \frac{1}{2} d_1 \frac{d_2}{2} + \frac{1}{2} d_1 \frac{d_2}{2}$

$= 2 \times \frac{1}{2} d_1 \frac{d_2}{2}$

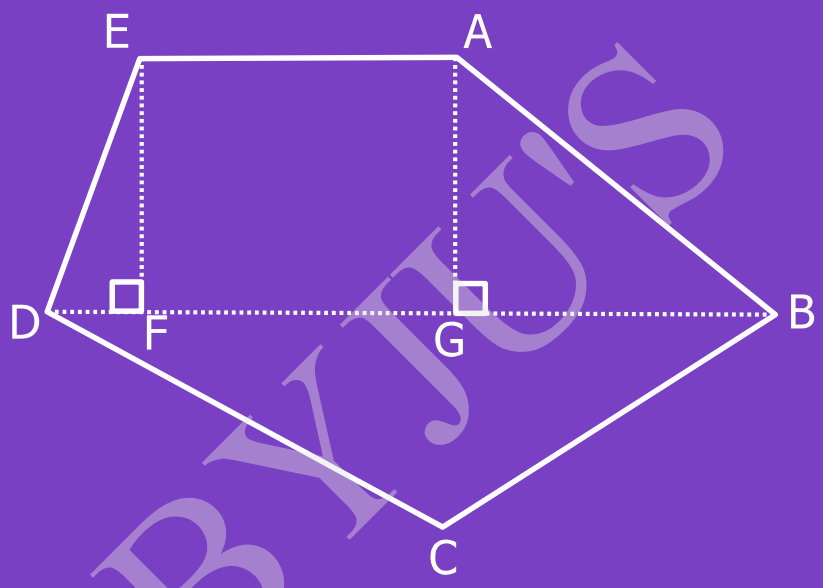
$= \frac{1}{2} d_1 d_2$

Area of a rhombus = $\frac{1}{2}$ × product of its diagonals

1. Mensuration of 2D Shapes

1.5. Area of a Polygon

- While finding the area of a polygon, the polygon needs to be divided into triangles and quadrilaterals and their individual areas should be added.



Consider a polygon ABCDE.
Here, DB is a diagonal. Line segments EF and AG are the perpendiculars from points E and A on DB, respectively.

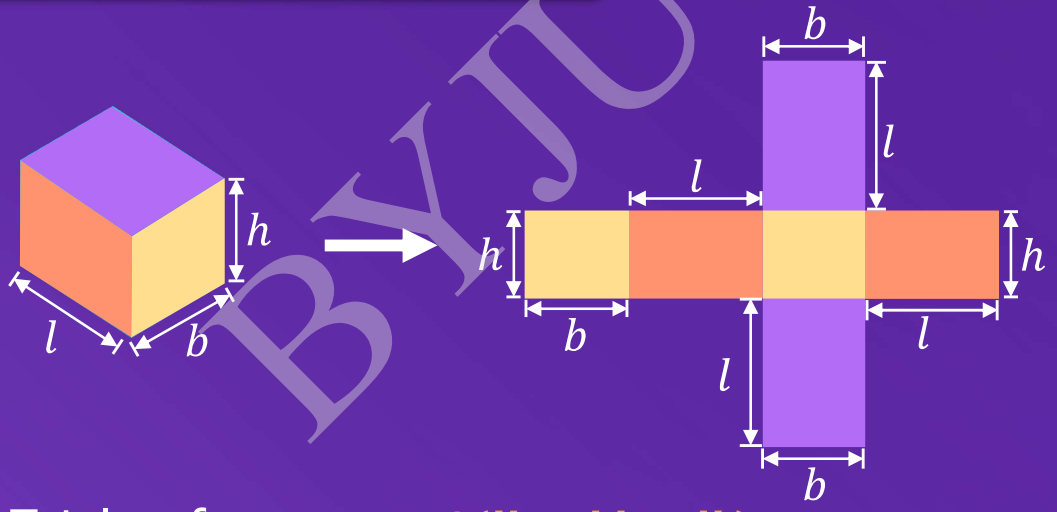
Area of polygon ABCDE
= Area of △DFE + Area of △AGB + Area of △DCB + Area of □EFGA

2. Mensuration of 3D Shapes

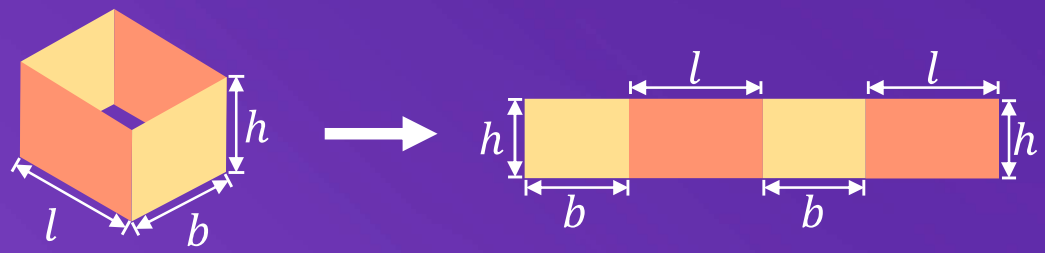
2.1. Surface Area

- The total surface area of a 3D shape is the sum of the area of all the faces.
- The lateral surface area of a 3D shape is the sum of the area of all the faces excluding the top and the bottom face.

Surface area of a Cuboid



- Total surface area = $2(lb + bh + lh)$

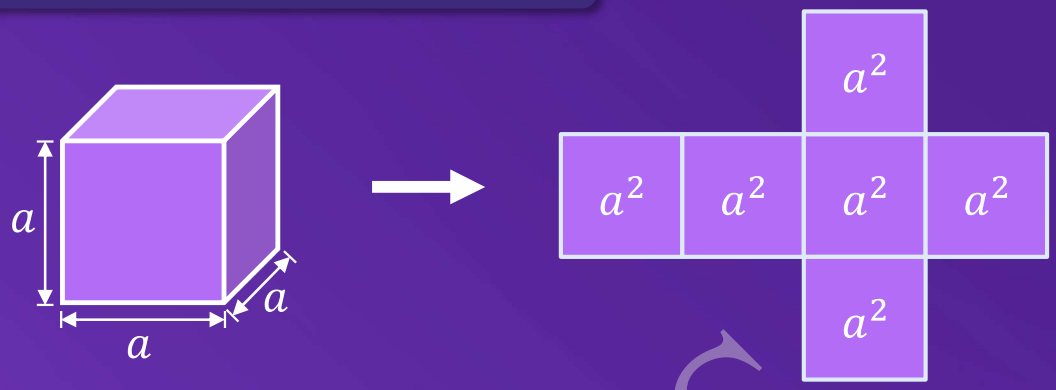


- Lateral surface area = $2(lh + bh)$

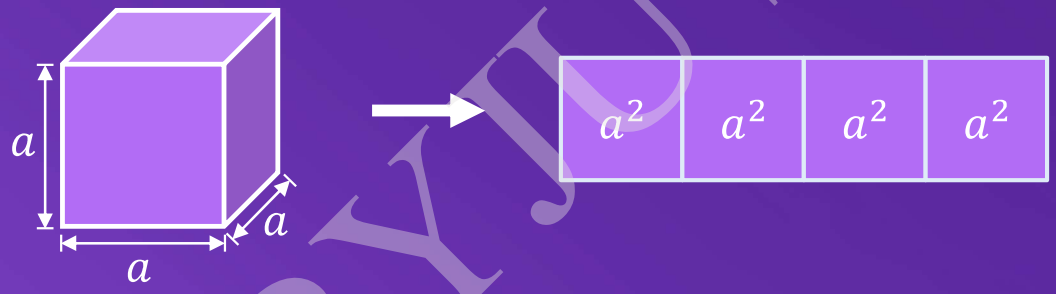
2. Mensuration of 3D Shapes

2.1. Surface Area

Surface area of a Cube

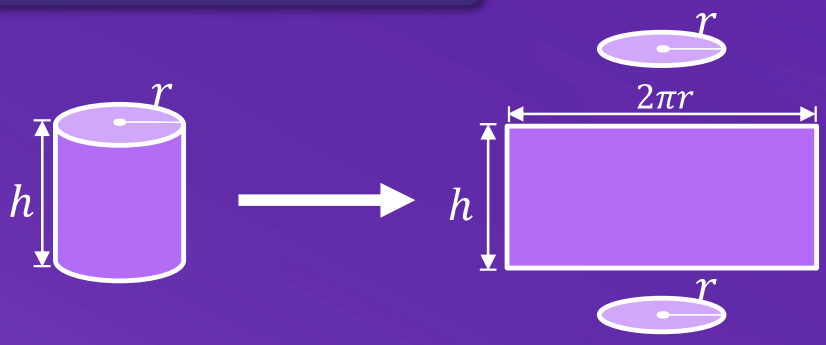


- Total surface area = $6a^2$



- Lateral surface area = $4a^2$

Surface area of a Cylinder



- Total surface area = $\pi r^2 + 2\pi rh + \pi r^2 = 2\pi r(r + h)$
- Lateral (Curved) surface area = $2\pi rh$

2. Mensuration of 3D Shapes

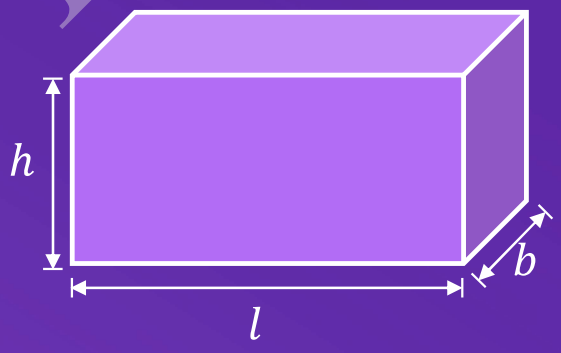
2.2. Volume

The amount of space occupied by a 3D object is called its volume. It is calculated as the area of the base of a 3D object multiplied by its height.

There is not much difference between volume and capacity.

- Volume refers to the amount of space occupied by an object.
- Capacity refers to the quantity that a container holds. It is also measured in litres.
- 1 litre = 1000 cm^3 and 1 m^3 = 1000 litres

Volume of a Cuboid



Volume = Area of the base × Height

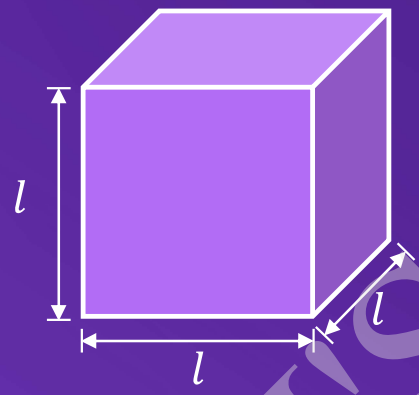
$= (l \times b) \times h$

$= l \times b \times h$

2. Mensuration of 3D Shapes

2.2. Volume

Volume of a Cube

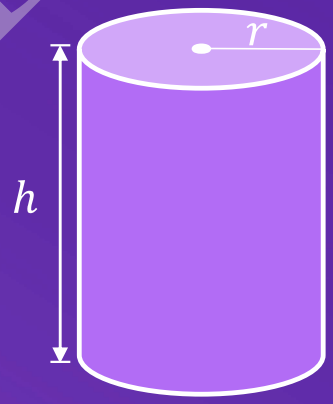


Volume = Area of the base × Height

$= (l \times l) \times l$

$= l^3$

Volume of a Cylinder



Volume = Area of the base × Height

$= (\pi r^2) \times h$

$= \pi r^2 h$