NOTES

– NOTES WITH MIND MAPS –

MATHEMATICS

(MENSURATION)

6TH

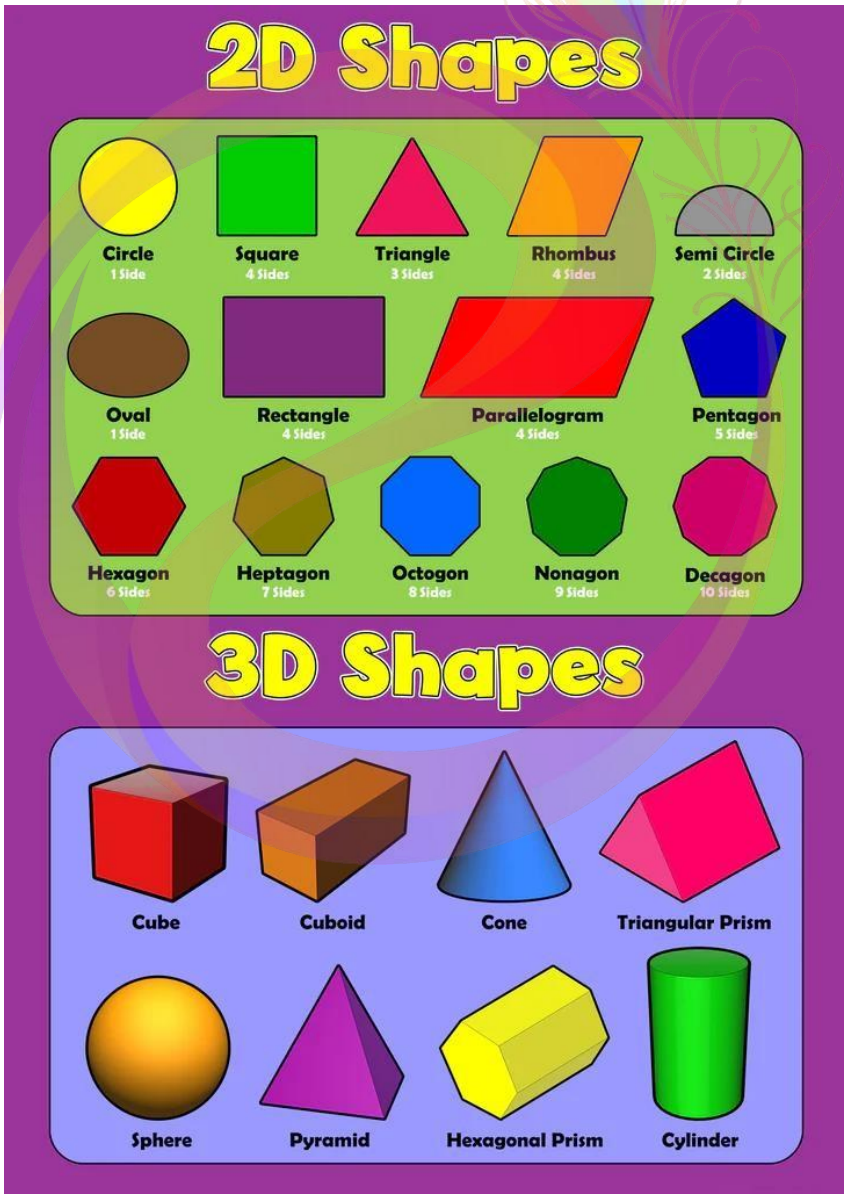
MENSURATION

Mensuration

Mensuration is the branch of mathematics that deals with the measurement of length, area or volume of various geometric shapes.

A branch of mathematics that talks about the length, volume, or area of different geometric shapes is called Mensuration. These shapes exist in 2 dimensions or 3 dimensions. Let's learn the difference between the two.

Differences Between 2D and 3D shapes



2D Shape	3D Shape
If a shape is surrounded by three or more straight lines in a plane, then it is a 2D shape.	If a shape is surrounded by a no. of surfaces or planes then it is a 3D shape.
These shapes have no depth or height.	These are also called solid shapes and unlike 2D they have height or depth.
These shapes have only two dimensions say length and breadth.	These are called Three dimensional as they have depth (or height), breadth and length.
We can measure their area and Perimeter.	We can measure their volume, CSA, LSA or TSA.

Mensuration in Math's- Important Terminologies

Let's learn a few more definitions related to this topic.

Terms	Abbreviation	Unit	Definition
Area	A	m^2 or cm^2	The area is the surface which is covered by the closed shape.
Perimeter	P	cm or m	The measure of the continuous line along the boundary of the given figure is called a Perimeter.
Volume	V	cm^3 or m^3	The space occupied by a 3D shape is called a Volume.
Curved Surface Area	CSA	m^2 or cm^2	If there's a curved surface, then the total area is called a Curved Surface area. Example: Sphere
Lateral Surface area	LSA	m^2 or cm^2	The total area of all the lateral surfaces that surrounds the given figure is called the

			Lateral Surface area.
Total Surface Area	TSA	m^2 or cm^2	The sum of all the curved and lateral surface areas is called the Total Surface area.
Square Unit	–	m^2 or cm^2	The area covered by a square of side one unit is called a Square unit.
Cube Unit	–	m^3 or cm^3	The volume occupied by a cube of one side one unit

Mensuration Formulas

Now let's learn all the important mensuration formulas involving 2D and 3D shapes. Using this mensuration formula list, it will be easy to solve the mensuration problems. Students can also download the mensuration formulas list PDF from the link given above. In general, the most common formulas in mensuration involve surface area and volumes of 2D and 3D figures.

Mensuration Formulas

Perimeter	
Square	$P = 4s$
Rectangle	$P = 2(l + w)$

Circumference	
Circle	$C = 2\pi r$

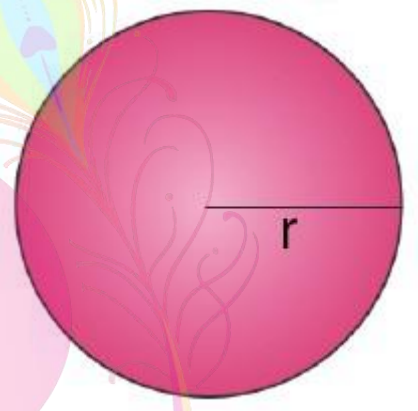
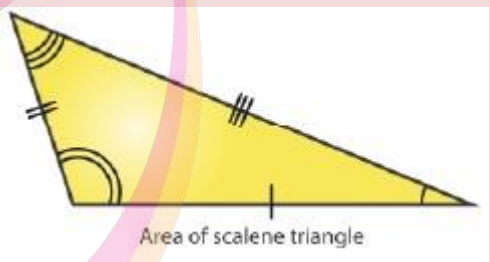
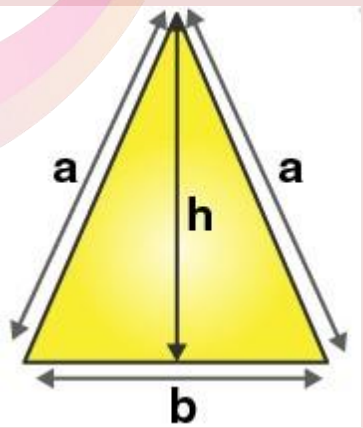
Area	
Square	$A = s^2$
Rectangle	$A = lw$
Triangle	$A = \frac{1}{2}bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
Circle	$A = \pi r^2$

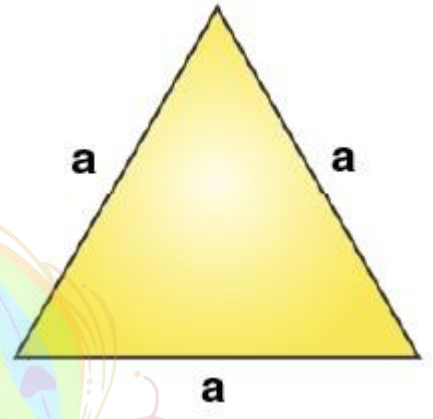
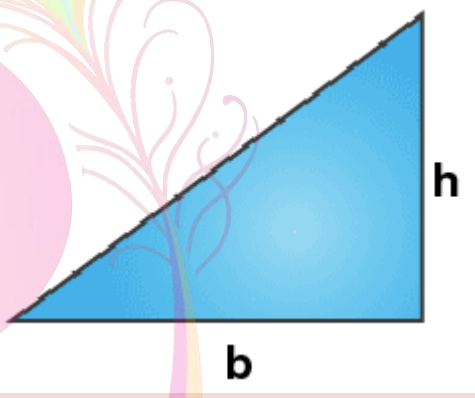
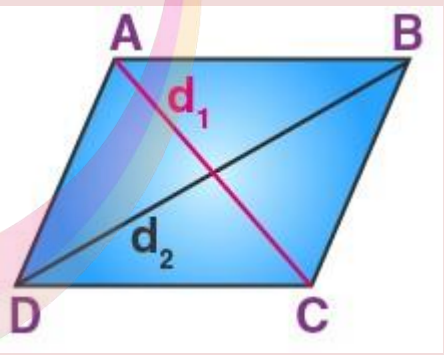
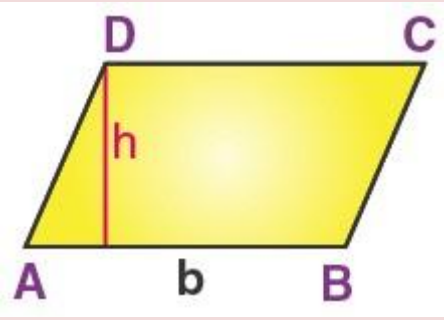
Surface Area	
Cube	$SA = 6s^2$
Cylinder	$SA = 2\pi rh + 2\pi r^2$
Cone	$SA = \pi rl$
Sphere	$SA = 4\pi r^2$

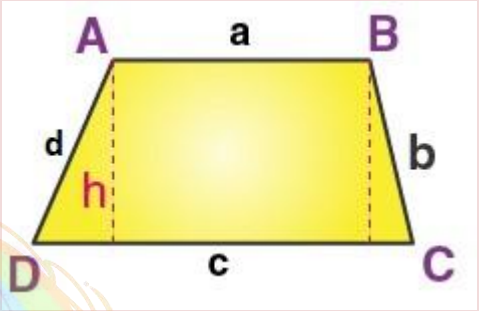
Volume	
Cube	$V = s^3$
Cylinder	$V = \pi r^2 h$
Cone	$V = \frac{1}{3}\pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$

Mensuration Formulas For 2D Shapes

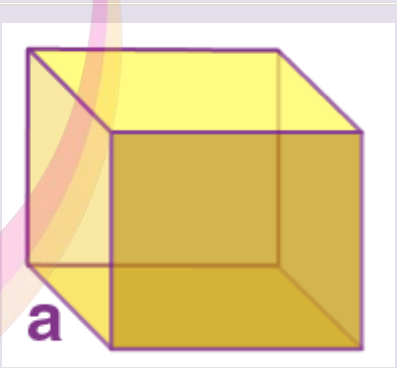
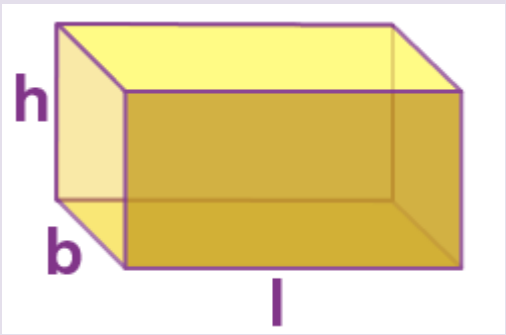
Shape	Area (Square units)	Perimeter (units)	Figure
Square	a^2	4a	

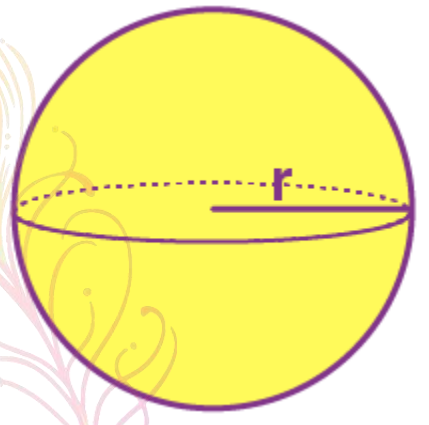
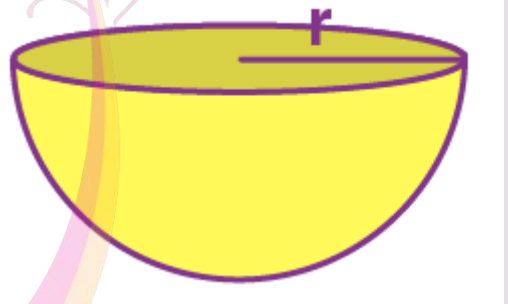
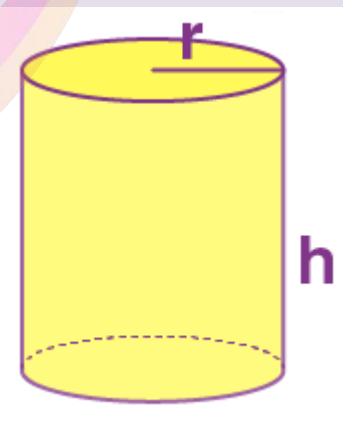
Shape	Area (Square units)	Perimeter (units)	Figure
Rectangle	$l \times b$	$2 (l + b)$	
Circle	πr^2	$2 \pi r$	
Scalene Triangle	$\sqrt{[s(s-a)(s-b)(s-c)]}$, Where, $s = (a+b+c)/2$	$a+b+c$	
Isosceles Triangle	$\frac{1}{2} \times b \times h$	$2a + b$	

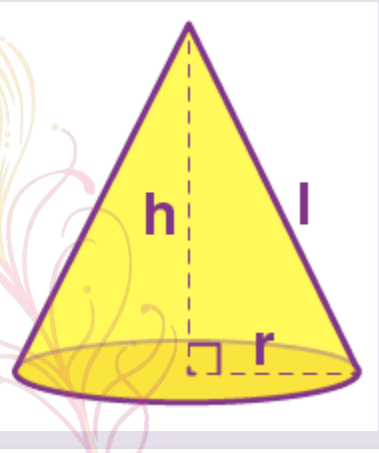
Shape	Area (Square units)	Perimeter (units)	Figure
Equilateral triangle	$(\sqrt{3}/4) \times a^2$	3a	
Right Angle Triangle	½ × b × h	b + hypotenuse + h	
Rhombus	½ × d_1 × d_2	4 × side	
Parallelogram	b × h	2(l+b)	

Shape	Area (Square units)	Perimeter (units)	Figure
Trapezium	½ h(a+c)	a+b+c+d	

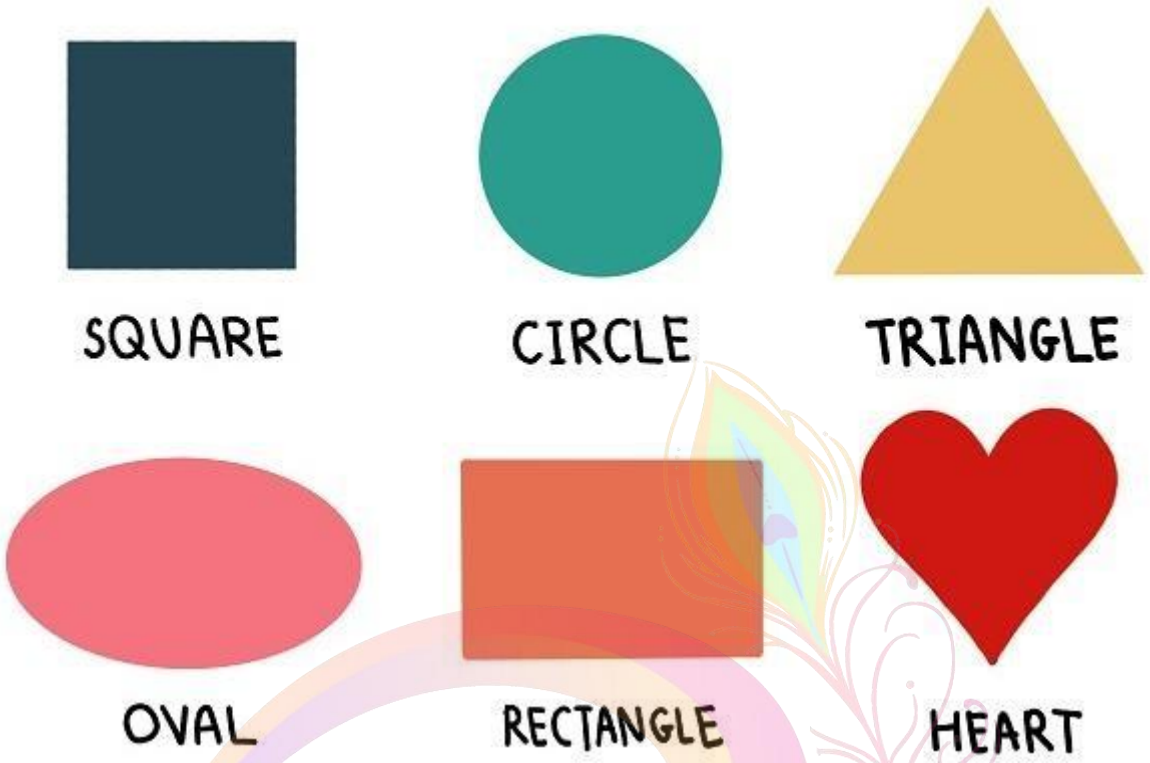
Mensuration Formulas for 3D Shapes

Shape	Volume (Cubic units)	Curved Surface Area (CSA) or Lateral Surface Area (LSA) (Square units)	Total Surface Area (TSA) (Square units)	Figure
Cube	a^3	LSA = 4 a^2	6 a^2	
Cuboid	l × b × h	LSA = 2h(l + b)	2 (lb +bh +hl)	

Shape	Volume (Cubic units)	Curved Surface Area (CSA) or Lateral Surface Area (LSA) (Square units)	Total Surface Area (TSA) (Square units)	Figure
Sphere	$(4/3)\ \pi\ r^3$	$4\ \pi\ r^2$	$4\ \pi\ r^2$	
Hemisphere	$(⅔)\ \pi\ r^3$	$2\ \pi\ r^2$	$3\ \pi\ r^2$	
Cylinder	$\pi\ r^2\ h$	$2\pi\ r\ h$	$2\pi rh + 2\pi r^2$	

Shape	Volume (Cubic units)	Curved Surface Area (CSA) or Lateral Surface Area (LSA) (Square units)	Total Surface Area (TSA) (Square units)	Figure
Cone	(⅓) π r^2 h	π r l	πr (r + l)	

Shapes

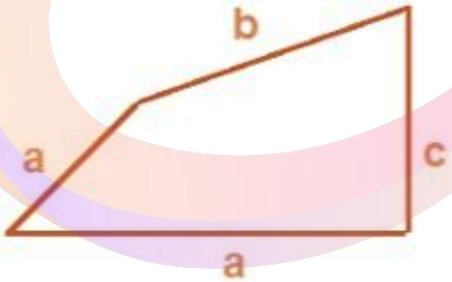


A shape is the form of an object.

Examples of two-dimensional shapes are square, rectangle and triangle, and of three-dimensional shapes are cube, cuboid and sphere.

Perimeter

Perimeter is the total length or total distance covered along the boundary of a closed shape.



$p = a + b + c + d$

Perimeter of a circle is also called as the circumference of the circle.

Perimeter of a Triangle