

Surface Area and Volume

Mensuration

- It is branch of mathematics which is concerned about the measurement of length ,area and Volume of plane and Solid figure

Perimeter

- The perimeter of plane figure is defined as the length of the boundary
- Its units are same as that of length i.e. m ,cm,km

1 Meter	10 Decimeter	100 centimeter
1 Decimeter	10 centimeter	100 millimeter
1 Km	10 Hectometer	100 Decameter
1 Decameter	10 meter	1000 centimeter

Surface Area or Area

- The area of the plane figure is the surface enclosed by its boundary
- Its unit is square of length unit. i.e. m^2 , km^2

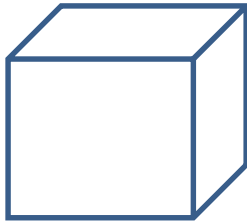
1 square Meter	100 square Decimeter	10000 square centimeter
1 square Decimeter	100 square centimeter	10000 square millimeter
1 Hectare	100 square Decameter	10000 square meter
1 square myrameter	100 square kilometer	10^8 square meter

Volume

1 cm^3	1mL	1000 mm^3
1 Litre	1000ml	1000 cm^3
1 m^3	10^6 cm^3	1000 L
1 dm^3	1000 cm^3	1 L

Surface Area

Surface Area and Volume of Cube and Cuboid



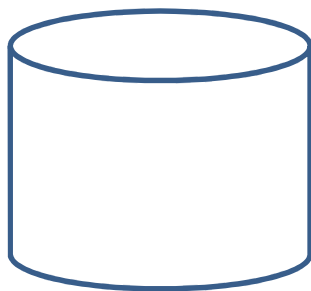
Cube



Cuboid

Type	Measurement
Surface Area of Cuboid of Length L, Breadth B and Height H	$2(LB + BH + LH)$
Lateral surface area of the cuboids	$2(L + B)H$
Diagonal of the cuboids	$\sqrt{L^2 + B^2 + H^2}$
Volume of a cuboids	LBH
Length of all 12 edges of the cuboids	$4(L+B+H)$
Surface Area of Cube of side L	$6L^2$
Lateral surface area of the cube	$4L^2$
Diagonal of the cube	$L\sqrt{3}$
Volume of a cube	L^3

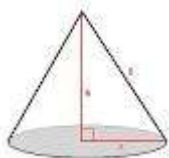
Surface Area and Volume of Right circular cylinder



Radius	The radius (r) of the circular base is called the radius of the cylinder
Height	The length of the axis of the cylinder is called the height (h) of the cylinder
Lateral Surface	The curved surface joining the two base of a right circular cylinder is called Lateral Surface.

Type	Measurement
Curved or lateral Surface Area of cylinder	$2\pi rh$
Total surface area of cylinder	$2\pi r (h+r)$
Volume of Cylinder	$\pi r^2 h$

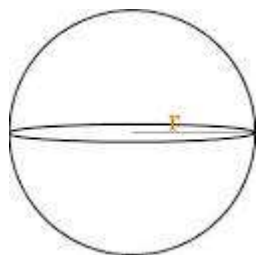
Surface Area and Volume of Right circular cone



Radius	The radius (r) of the circular base is called the radius of the cone
Height	The length of the line segment joining the vertex to the centre of base is called the height (h) of the cone.
Slant Height	The length of the segment joining the vertex to any point on the circular edge of the base is called the slant height (L) of the cone.
Lateral surface Area	The curved surface joining the base and uppermost point of a right circular cone is called Lateral Surface

Type	Measurement
Curved or lateral Surface Area of cone	$\pi r L$
Total surface area of cone	$\pi r (L+r)$
Volume of Cone	$\frac{1}{3} \pi r^2 h$

Surface Area and Volume of sphere and hemisphere



Sphere





Hemisphere

Sphere	A sphere can also be considered as a solid obtained on rotating a circle About its diameter
Hemisphere	A plane through the centre of the sphere divides the sphere into two equal parts, each of which is called a hemisphere
radius	The radius of the circle by which it is formed
Spherical Shell	The difference of two solid concentric spheres is called a spherical shell
Lateral Surface Area for Sphere	Total surface area of the sphere
Lateral Surface area of Hemisphere	It is the curved surface area leaving the circular base

Type	Measurement
Surface area of Sphere	$4\pi r^2$
Volume of Sphere	$\frac{4}{3}\pi r^3$
Curved Surface area of hemisphere	$2\pi r^2$
Total Surface area of hemisphere	$3\pi r^2$
Volume of hemisphere	$\frac{2}{3}\pi r^3$

Volume of the spherical shell whose outer and inner radii and 'R' and 'r' respectively	$\frac{4}{3}\pi(R^3 - r^3)$
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How the Surface area and Volume are determined

<p>Area of Circle</p> 	<p>The circumference of a circle is $2\pi r$. This is the definition of π (ρ). Divide the circle into many triangular segments. The area of the triangles is $1/2$ times the sum of their bases, $2\pi r$ (the circumference), times their height, r.</p> $A = \frac{1}{2} 2\pi r r = \pi r^2$
<p>Surface Area of cylinder</p> 	<p>This can be imagined as unwrapping the surface into a rectangle.</p>
<p>Surface area of cone</p>	<p>This can be achieved by divide the surface of the cone into its triangles, or the surface of the cone into many thin triangles. The area of the triangles is $1/2$ times the sum of their bases, p, times their height,</p> $A = \frac{1}{2} 2\pi r s = \pi r s$