

CBSE Class 09 Mathematics
Revision Notes
CHAPTER 13
SURFACE AREAS AND VOLUMES

1. Surface Area of a Cuboid and a Cube
2. Surface Area of a Right Circular Cylinder
3. Surface Area of a Right Circular Cone
4. Surface Area of a Sphere
5. Volume of a Cuboid
6. Volume of a Cylinder
7. Volume of a Right Circular Cone
8. Volume of a Sphere

Cuboid - with length l , breadth b and height h

Perimeter of Cuboid = $4(l + b + h)$

Length of diagonal = $\sqrt{l^2 + b^2 + h^2}$

Lateral surface area = $2h(l + b)$

Total surface area = $2(lb + bh + hl)$

Volume = lbh

Cube - with side a

Perimeter of cube = $12 \times \text{edge}$

Lateral surface area = $4a^2$

Total surface area = $6a^2$

Volume = a^3

Right Prism

Lateral Surface area = Perimeter of base x Height

Total surface area = Lateral Surface area + 2(Area of one end)

Volume = Area of base x Height

Right Circular Cylinder - with radius r and height h

Curved Surface area = $2\pi rh$

Total surface area = $2\pi r(r + h)$

Volume = $\pi r^2 h$

Hollow Cylinder

Each base surface area = $\pi (R^2 - r^2)$

Curved surface area = $2\pi h (R + r)$

Total surface area = $2\pi (R + r) (h + R - r)$

Volume = $\pi h (R^2 - r^2)$

Right Pyramid

Lateral Surface area = $\frac{1}{2}$ x Perimeter of base x Slant Height

Total surface area = Lateral Surface area + Area of base

Volume = $\frac{1}{3}$ x Area of base x Height

Right Circular Cone - with radius r , height h and slant height l

A right circular cone is a solid generated by revolving a line segment which passes through a fixed point and which makes a constant angle with a fixed line. The fixed point is called the

vertex of the cone, the fixed line is called the axis of the cone.

$$\text{Curved Surface area} = \pi r l$$

$$\text{Total surface area} = \pi r (l + r)$$

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

$$\text{Volume} = \frac{1}{3} \times \text{Area of the base} \times \text{height}$$

Sphere (Solid) - with radius r

The set of all points in space which are equidistant from a fixed point is called a sphere. The fixed point is called the centre of the sphere and the constant distance is called its radius.

$$\text{Curved Surface Area} = 4\pi r^2$$

$$\text{Total surface area} = 4\pi r^2$$

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

Hemisphere - with radius r

$$\text{Curved Surface Area} = 2\pi r^2$$

$$\text{Total surface area} = 3\pi r^2$$

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

Spherical shell - with inner with radius r and outer radius R

$$\text{Volume} = \frac{4}{3} \pi (R^3 - r^3)$$