

Surface Area and Volume



Cube: A cube is a 3D solid with 6 equal square faces, 12 equal edges. All sides are equal in length.

- Surface Area = $6a^2$
- Curved Surface Area (CSA) = $4a^2$
- Volume = a^3
- Diagonal = $\sqrt{3} a$

Where, 'a' is the side length of cube.

Cuboid: A cuboid is a 3D figure with 6 rectangular faces, opposite faces are equal.

- Total Surface Area (TSA): $2(lb + bh + hl)$
- Curved Surface Area (CSA): $2h(l + b)$
- Volume: $l \times b \times h$
- Diagonal = $\sqrt{(l^2 + b^2 + h^2)}$

Where l , b , and h are length, breadth and height

Cylinder: A cylinder is a solid with two parallel circular bases connected by a curved surface. It has height h and base radius r .

- Total Surface Area (TSA): $2\pi r(h + r)$
- Curved Surface Area (CSA): $2\pi rh$
- Volume: $\pi r^2 h$

Practice Questions

1. What is the total surface area of a cube with side 5 cm?

Sol: Total Surface Area of a Cube

$$TSA = 6a^2$$

$$TSA = 6 \times 5^2$$

$$TSA = 6 \times 25$$

$$TSA = 150 \text{ cm}^2$$

2. The dimensions of a cuboid are 8 cm $\times$ 6 cm $\times$ 4 cm. What is its volume?

Sol: Volume of a Cuboid

$$V = l \times b \times h$$

$$V = 8 \times 6 \times 4$$

$$V = 192 \text{ cm}^3$$

3. The radius of a cylinder is 7 cm and height is 10 cm. What is its curved surface area?

Sol: Curved Surface Area of a Cylinder

$$CSA = 2\pi rh$$

$$CSA = 2 \times \frac{22}{7} \times 7 \times 10$$

$$CSA = 440 \text{ cm}^2$$

4. The volume of a cylinder is 1540 cm^3 and its radius is 7 cm. What is its height?

Sol: Volume of a Cylinder

$$V = \pi r^2 h$$

$$1540 = \frac{22}{7} \times 7 \times 7 \times h$$

$$1540 = 154h$$

$$h = \frac{1540}{154}$$

$$h = 10 \text{ cm}$$

5. A cuboid has length 9 cm, breadth 5 cm and height 4 cm. What is its total surface area?

Sol: Total Surface Area of a Cuboid

$$TSA = 2(lb + bh + lh)$$

$$TSA = 2[(9 \times 5) + (5 \times 4) + (9 \times 4)]$$

$$TSA = 2(45 + 20 + 36)$$

$$TSA = 2(101)$$

$$TSA = 202 \text{ cm}^2$$