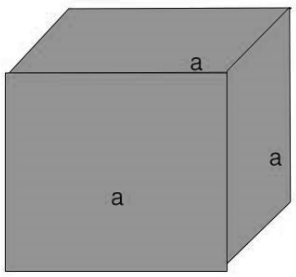
Surface Area of Cuboid and Cube

Understanding of Surface Area of Cuboid and Cube

- A cuboid is a 3D box with rectangular faces.
- A cube is a special cuboid with all edges equal.
- Surface Area is the total area of all outer faces of a solid.
- It helps us understand how much material is needed to cover the outer surface of a solid object.

Cube

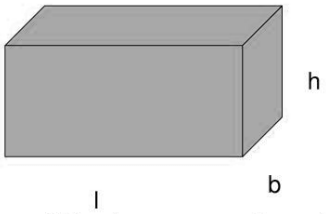


(Here all the faces are square)

Surface area = Area of all six faces

$= 6a^2$

cuboid



(Here all the faces are rectangular)

Surface area = Area of all six faces

= 2(lxb + bxh +hxl)

Important Points

- Surface Area of Cuboid = 2(lb + bh + hl).
- Surface Area of Cube = 6 × side².
- All measurements should be in the same units.
- Surface area is expressed in square units like cm², m².
- It includes both the lateral area and the area of top and bottom faces.

Examples with Solutions

Example 1: Surface Area of a Cuboid

➢ **Find the surface area of a cuboid with length 7 cm, breadth 5 cm, and height 3 cm.**

Solution: Surface Area = 2(lb + bh + hl)

= 2(7 × 5 + 5 × 3 + 3 × 7)

= 2(35 + 15 + 21)

= 2 × 71 = 142 cm²

Example: Surface Area of a Cube

➢ **Find the surface area of a cube with side 6 cm.**

Solution: Surface Area = 6 × 6²

= 6 × 36

= 216 cm²

Example: Surface Area with Fractions

➢ **Find the surface area of a cuboid with length $\frac{3}{2}$ m, breadth $\frac{1}{2}$ m, and height 2 m.**

Solution: SA = 2(lb + bh + hl)

$= 2\left(\left(\frac{3}{2} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times 2\right) + \left(2 \times \frac{3}{2}\right)\right)$

$= 2\left(\frac{3}{4} + 1 + 3\right)$

= 2(4.75) = 9.5 m²

Example: Finding Side When Surface Area is Given (Cube)

➢ **The surface area of a cube is 150 cm². Find the length of a side.**

Solution: Surface Area = 6s² → s² (150 cm = 6s²)

$= \frac{150}{6}$

= 25 = s²

$= \sqrt{25}$ = 5 cm

Example: Comparing Surface Areas

➢ **A cube has side 4 cm. A cuboid has dimensions 4 cm, 4 cm, and 2 cm. Which has more surface area?**

Cube SA = 6 × 4² = 6 × 16 = 96 cm²

Cuboid SA = 2(4 × 4 + 4 × 2 + 2 × 4)

= 2(16 + 8 + 8)

= 2 × 32 = 64 cm² **Answer:** Cube has more surface area.

Summary Points

- Surface Area of cuboid = 2(lb + bh + hl).
- Surface Area of cube = 6 × side².
- Use same units for all sides before calculating.
- Final answer is always in square units.
- Surface area is important for covering, painting, or wrapping solids.