

CHAPTER 14

Surface areas and Volumes (Cube and Cuboid)

Cuboid:

A solid bounded 6 rectangular plane faces with opposite faces are identical is called a cuboid.

Examples:

Toothpaste,

Book,

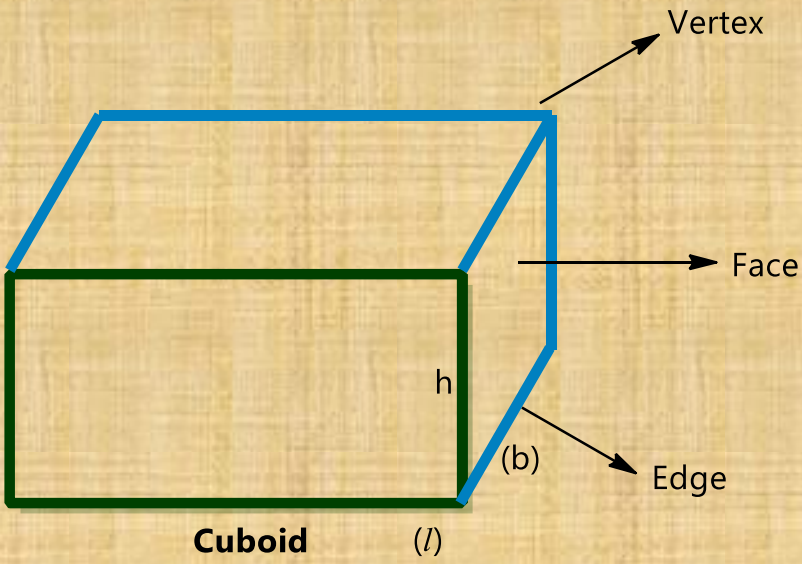
Coffee packet,

Matchbox etc.

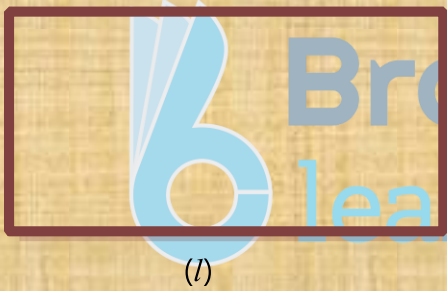


Brainbox
learn easy

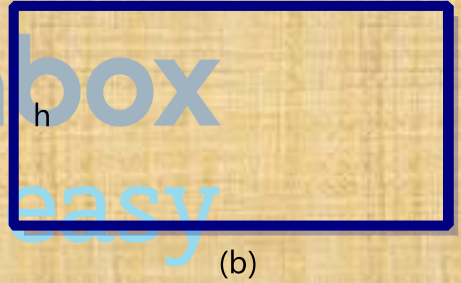
- It has 6 rectangular faces, 12 edges and 8 vertices.
- The face of top and bottom are called its bases.
- The front and back faces along with the 2 sides form the lateral surface of the cuboid.
- Opposite faces of cuboid are equal and parallel.
- They are four diagonals, which are in equal in length.



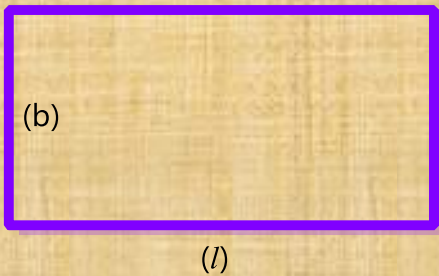
Front



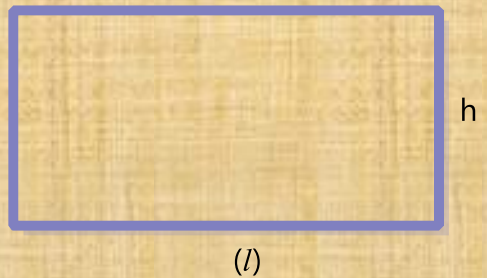
Right side



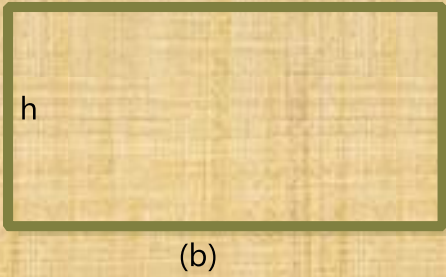
Top



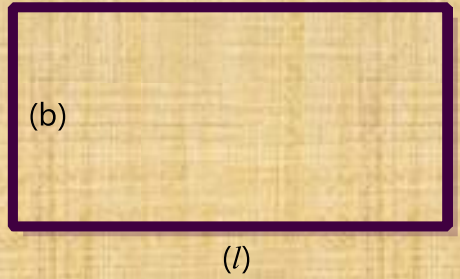
Back



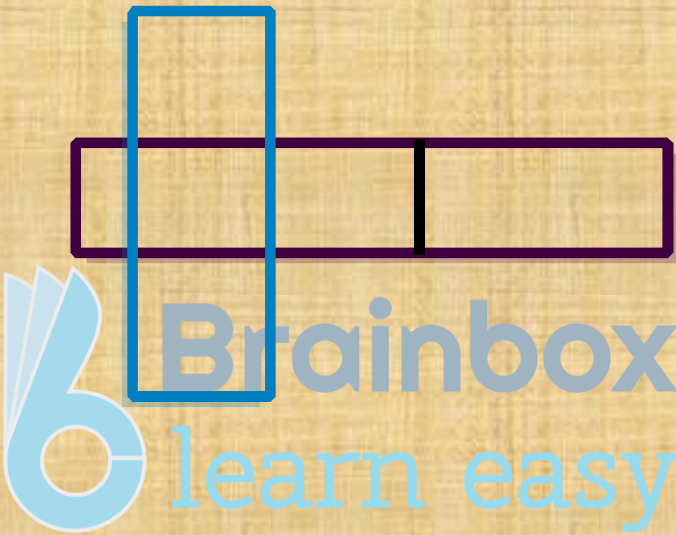
Left side



Bottom



- The net belonging to cuboid is



Note:

Cuboid has three pair of identical faces.

Surface area of cuboid:

Let,

l = Length

b = Breadth (Width)

h = Height

These are its dimensions of cuboid.

Lateral surface area of cuboid

= Sum of the areas of its '4' rectangular faces

$$= \underset{\text{Front}}{(l \times h)} + \underset{\text{Back}}{(l \times h)} + \underset{\text{Right}}{(b \times h)} + \underset{\text{Left}}{(b \times h)}$$

$$= 2lh + 2bh$$

∴ Lateral surface area of a cuboid = $2h(l + b)$ Sq. units

Total surface area of a cuboid = Sum of the areas of all rectangular faces

$$= \underset{\text{Front}}{(l \times h)} + \underset{\text{Back}}{(l \times h)} + \underset{\text{Right}}{(b \times h)} + \underset{\text{Left}}{(b \times h)} + \underset{\text{Top}}{(l \times b)} + \underset{\text{Bottom}}{(l \times b)}$$

$$= 2lh + 2bh + 2lb$$

∴ **Total surface area of a cuboid** = $2(lb + bh + hl)$ **Sq. units**

Note:

Area of 4 walls of a room:

The 4 walls of a room = The lateral surfaces of a cuboid

∴ The area of 4 walls of a room = The lateral surface area of a cuboid

$$= 2h(l + b)$$

(OR)

$$= 2(l+b) \times h$$

The area of 4 walls of a room = (Perimeter of the floor) × Height

Note:

The length of the longest pole that can be placed in a cuboidal room is the diagonal of the cuboid.

∴ The diagonal of a cuboid is $\sqrt{l^2 + b^2 + h^2}$.

