

Recognition of Solids

- We see a few shapes in our day- to-day life which are not flat. Some of these shapes are solids.



(Cricket ball : a sphere)



(Brick : a cuboid)



(Ice cream : a cone)

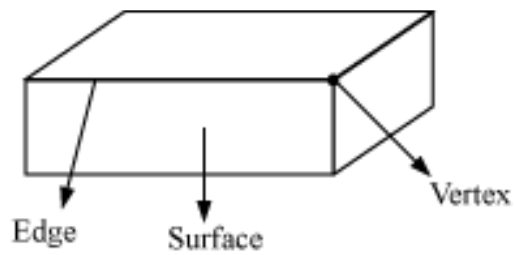


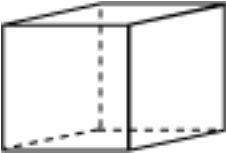
(Battery : a cylinder)

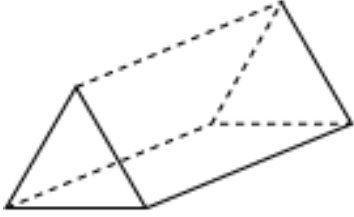


(Die : a cube)

- Each side of a cuboid is flat, called a **flat surface** (or surface). Two faces meet at a line segment called an **edge**. Three edges meet at a point called the **vertex**.



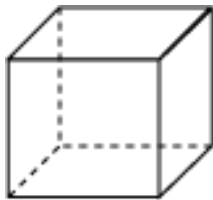
Solid	Figure	Properties
Cube		6 faces 12 edges 8 vertices (corners)
Cuboid		6 faces 12 edges 8 vertices
Cylinder		2 flat faces (circles) 1 curved face
Cone		1 flat surface 1 curved surface 1 vertex
Triangular Pyramid		4 faces 6 edges 4 vertices
Square pyramid		5 faces 8 edges 5 vertices
Triangular prism		5 faces 9 edges

		6 vertices
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- For any polyhedron, $F + V - E = 2$, where F is the number of faces, V is the number of vertices and E is the number of edges.

This relationship is called Euler's formula.

Example: Verify Euler's formula for the given solid.



Solution:

The given figure is a cube.

We have

Number of vertices, $V = 8$

Number of edges, $E = 12$

Number of faces, $F = 6$

Thus, $F + V - E = 6 + 8 - 12 = 14 - 12 = 2$

Hence, Euler's formula is verified.