Vertices, Edges and Faces

Understanding: Vertices, Edges and Faces

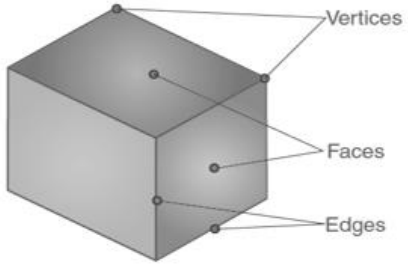
- Faces are the flat or curved surfaces of a 3D shape.
- Edges are the lines where two faces meet.
- Vertices are the corners or points where edges meet.

Consider a cuboid, the faces, edges and vertices are shown below:

The number of faces = 6

Number of edges = 12

Number of vertices = 8



Important Points

- 3D shapes like cubes, cuboids, cones, cylinders, and spheres have faces, edges, and vertices
- A cube has square faces
- A sphere has only a curved face and no edges or vertices

Euler's Formula for solid shapes

- **F + V – E = 2**

  where F = number of faces, V = number of vertices, E = number of edges

Examples with Solutions

Example: How many faces, edges, and vertices does a cube have?

Cube has 6 faces, 12 edges, 8 vertices

- F = 6, E = 12, V = 8

Example: A cuboid has 6 faces, 12 edges, and 8 vertices. Check Euler's formula

F + V – E = 6 + 8 – 12 = 2

- Euler's formula is satisfied

Example: How many vertices and edges does a square pyramid have?

It has 5 faces (1 square base + 4 triangles), 8 edges, and 5 vertices

- F = 5, E = 8, V = 5

Example: A cylinder has 3 faces, 2 edges, and no vertices. Explain

It has 2 flat circular faces and 1 curved face, 2 curved edges, and no sharp corner

- F = 3, E = 2, V = 0

Example: Does a sphere have edges or vertices?

A sphere is fully round, with only 1 curved face

- F = 1, E = 0, V = 0

Summary Points

- Faces are the surfaces of a solid shape.
- Edges are where two faces meet.
- Vertices are points where edges meet.
- Use Euler's formula: F + V – E = 2 for solids.
- Real-life solids like boxes, balls, and cones have different combinations of faces, edges, and vertices.