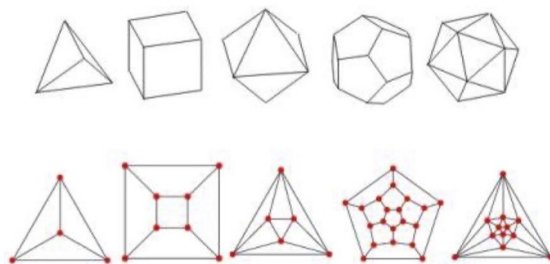


Recall that a polyhedron is a 3-dimensional shape with flat polygonal faces, straight edges and sharp corners. We say a polyhedron is regular if each polygonal face has the same number of edges and the number of faces (or the number of edges) meeting at each corner is the same. For example, in a cube, each face has 4 edges and 3 faces meet at each corner.

Theorem 1. *There are exactly 5 regular polyhedrons. Namely: the tetrahedron, the cube, the octahedron, the dodecahedron and the icosahedron.*



Here are some key concepts we need to prove the theorem.

- A Graph with an edge set \mathcal{E} and a vertex set \mathcal{V} . We let $E = |\mathcal{E}|$ and $V = |\mathcal{V}|$.
- Degree $\deg(v)$ of a vertex $v \in \mathcal{V}$.
- The edge degree formula:

$$\sum_{v \in \mathcal{V}} \deg(v) = 2E$$

- Planar graphs.
- Euler's formula

$$V - E + F = 2.$$

