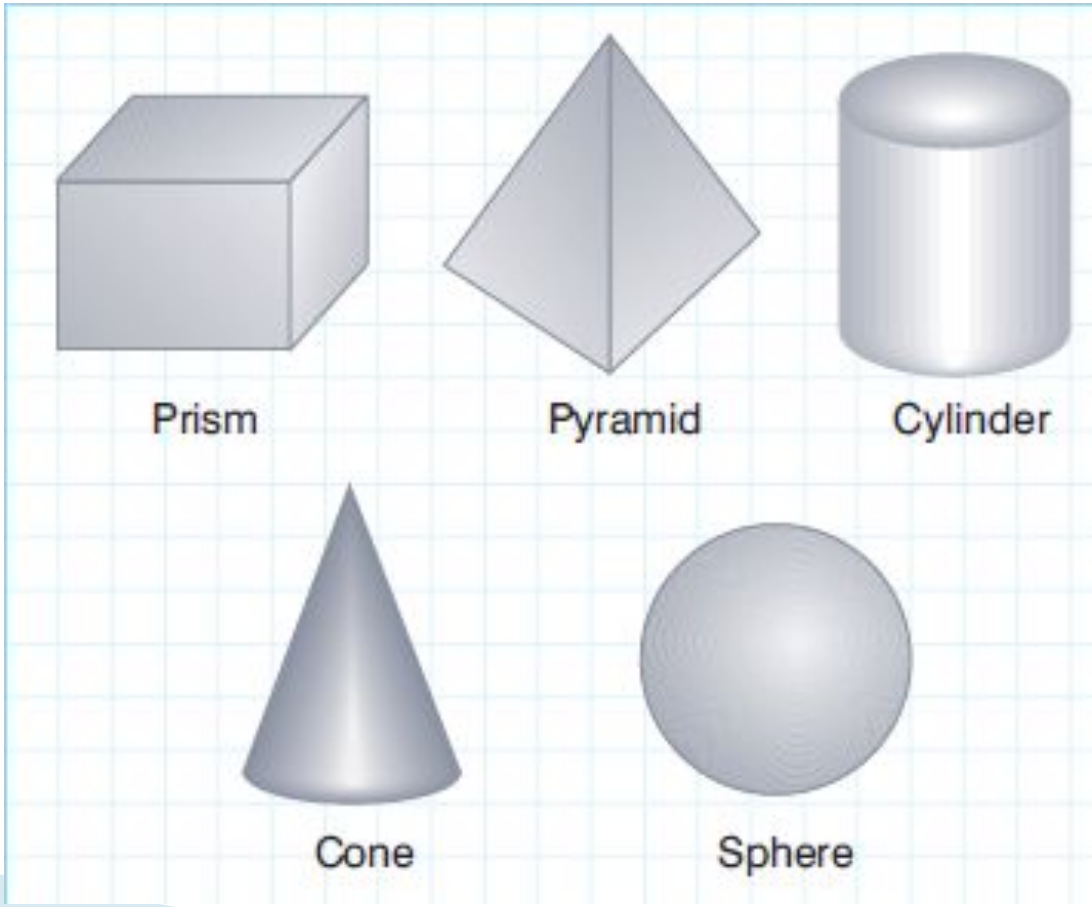
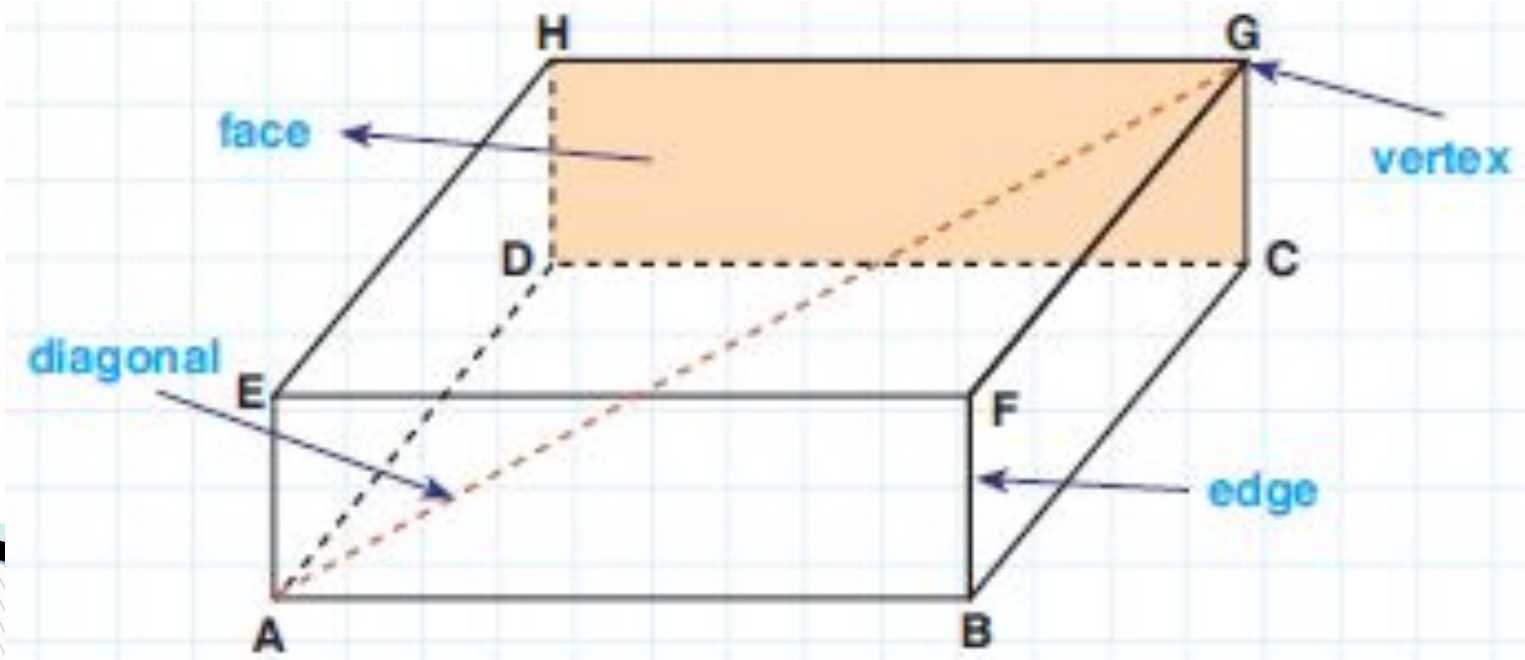
POLYHEDRON

Figures in three dimensional geometry (space geometry) have thickness as well as length and width.



- The polygons that make up a polyhedron are called the **faces.**
- A line segment formed by the intersection of two faces is called an **edge of the polyhedron.**
- A point where three or more edges meet is called a vertex of the polyhedron.
- A line joining two vertices not in the same face is called a **diagonal of the polyhedron.**
- The surface of a polyhedron consists of all points on its faces.



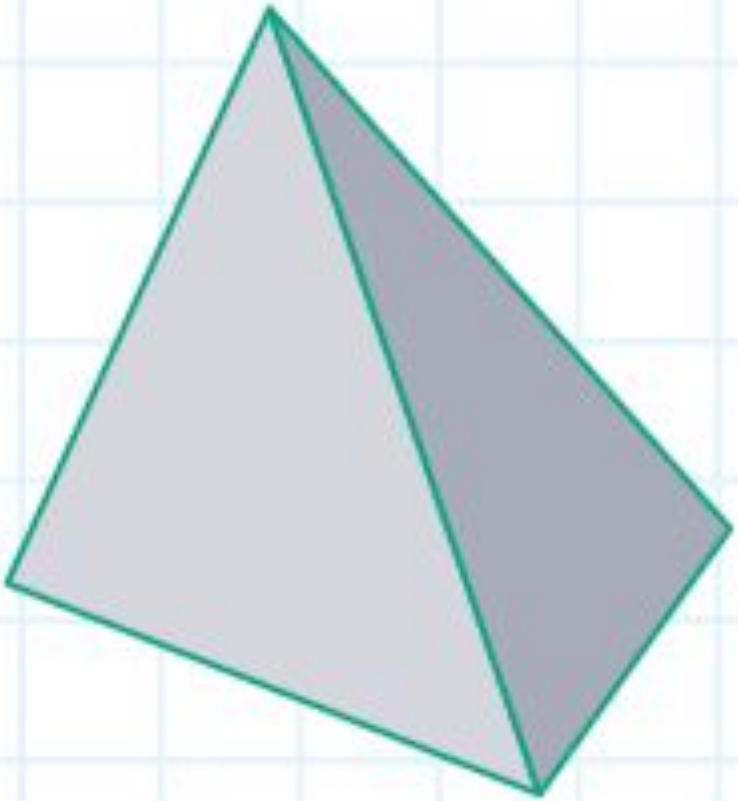
Number of faces	Polyhedron
4	Tetrahedron
5	Pentahedron
6	Hexahedron
7	Heptahedron
8	Octahedron
12	Dodecahedron
20	Icosahedron

Regular Polyhedrons

A convex polyhedron is **regular** if and only if it has congruent regular polygons for faces and every polyhedral angle has the same face angles.

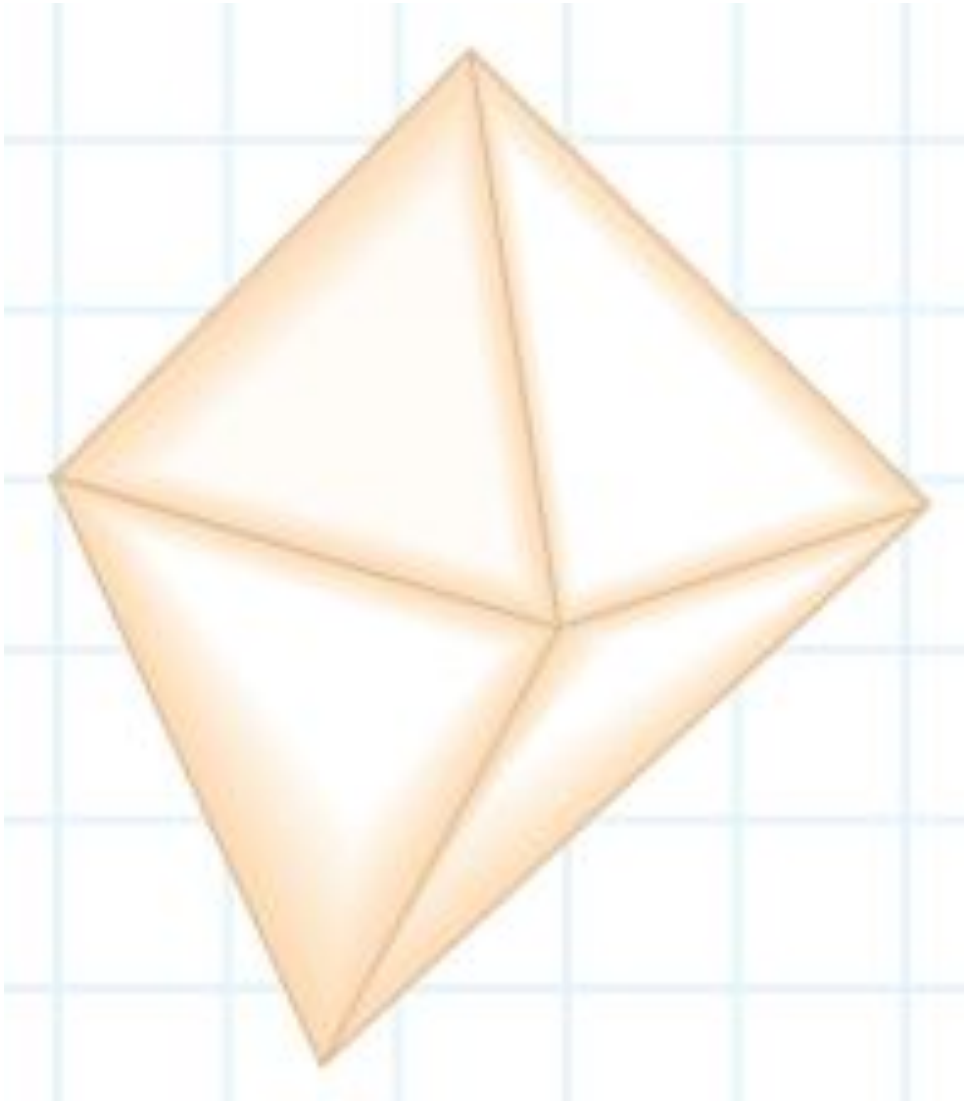
1. At least three faces must converge to each vertex.
2. Faces should be regular polygons (equilateral triangle, square, etc.)
3. The sum of the face angles at the vertex of a polyhedral angle must be less than 360°.

Regular Tetrahedron

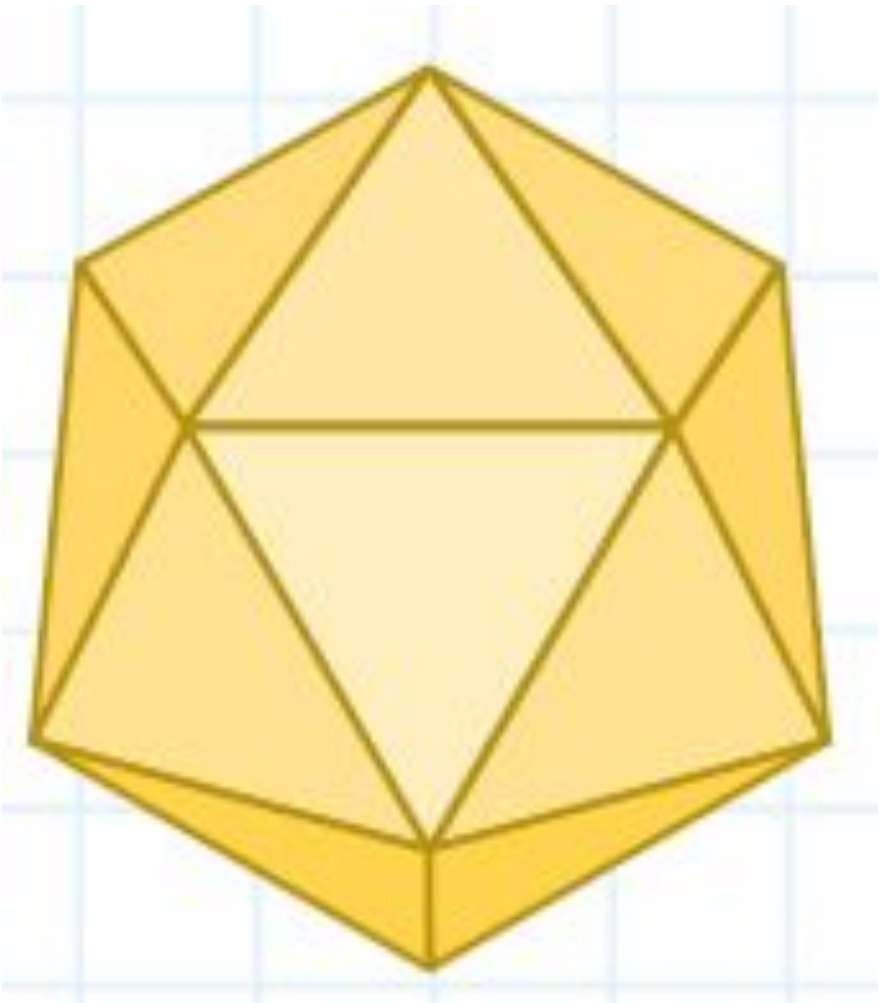


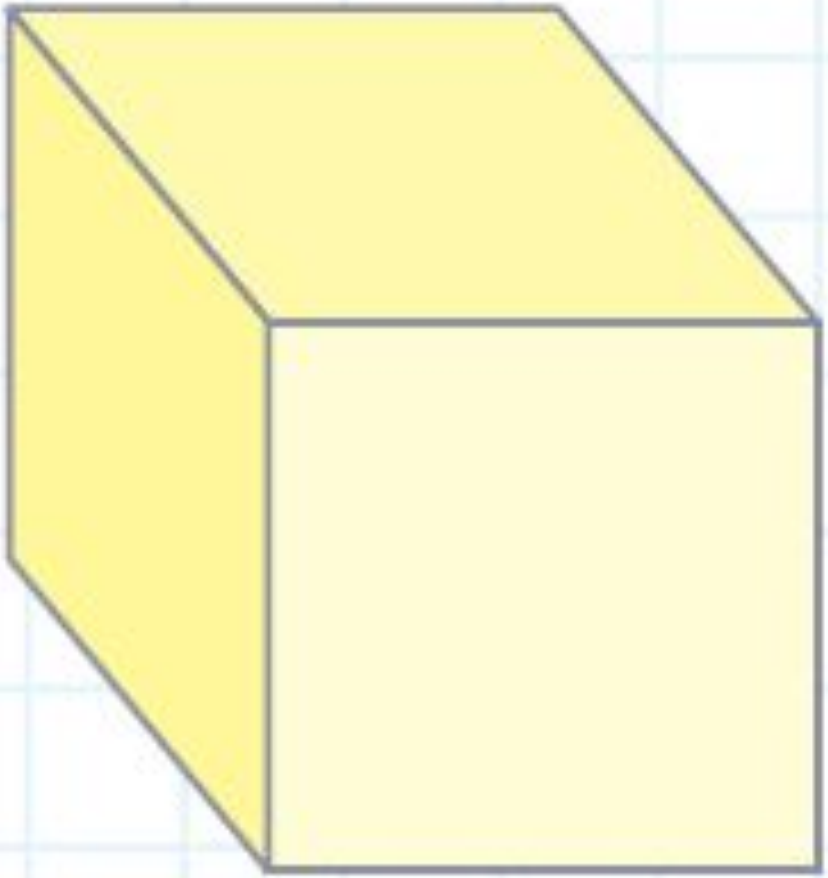
Regular
Tetrahedron

Regular Octahedron



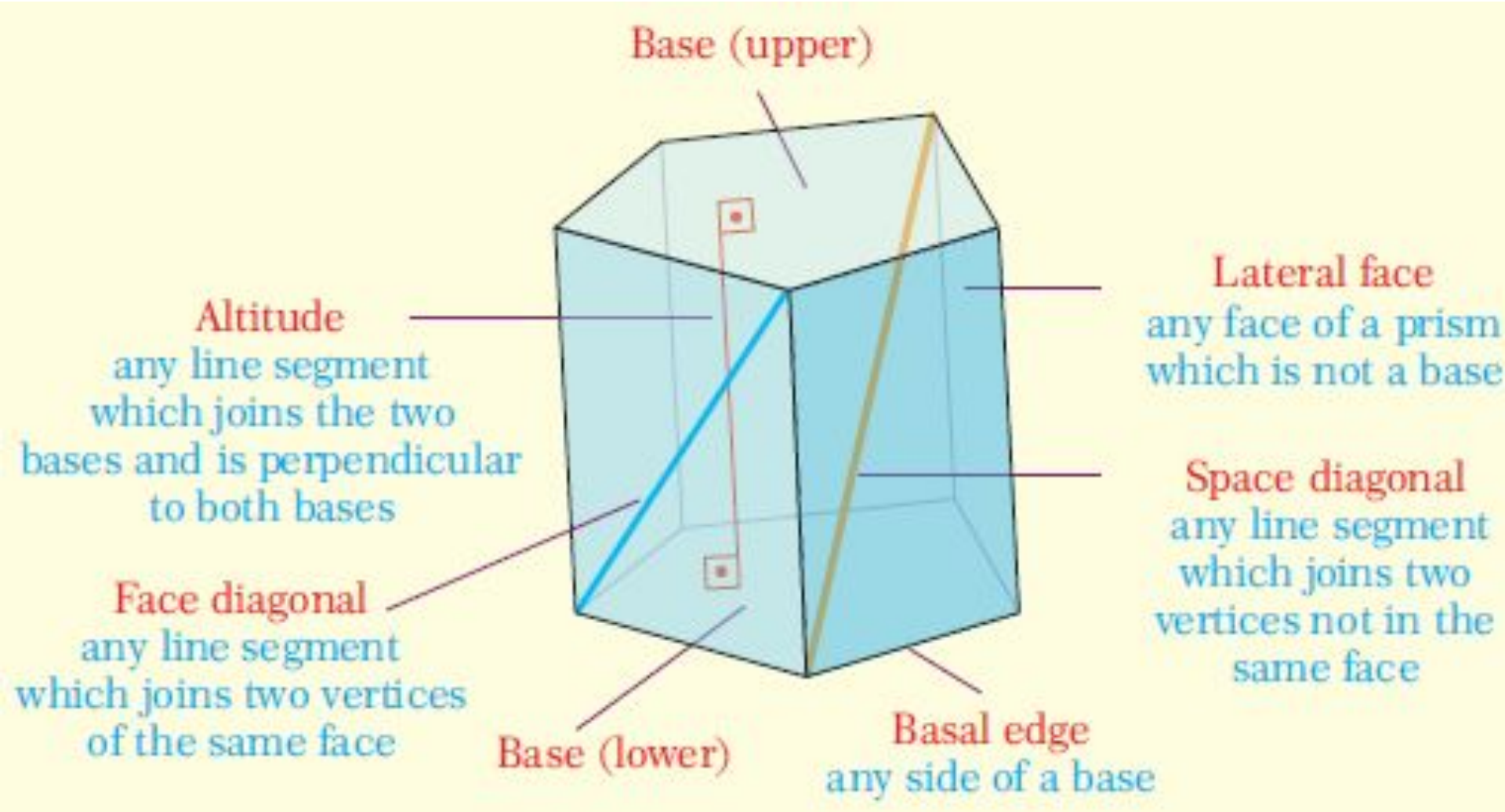
Regular Icosahedron



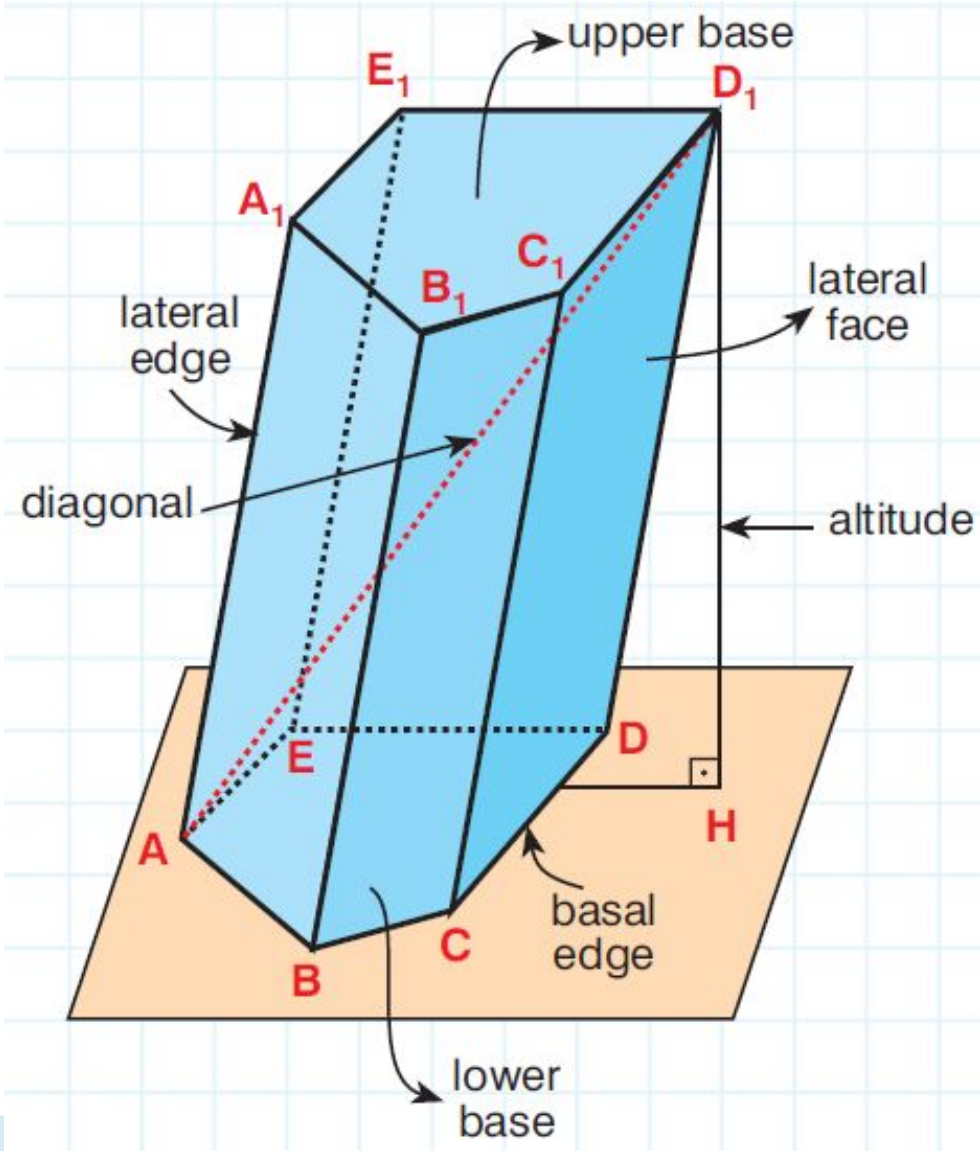


Regular Hexahedron (Cube)

Some Important Polyhedrons
1. Prisms

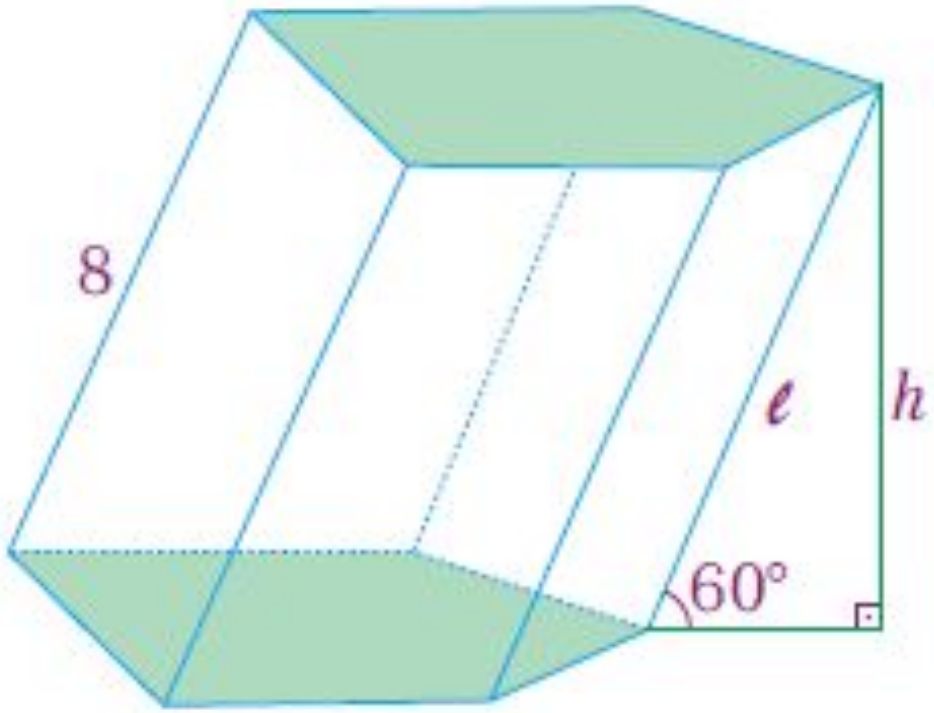


The length of any altitude is called the HEIGHT of the prism. The height is the perpendicular distance between the bases.

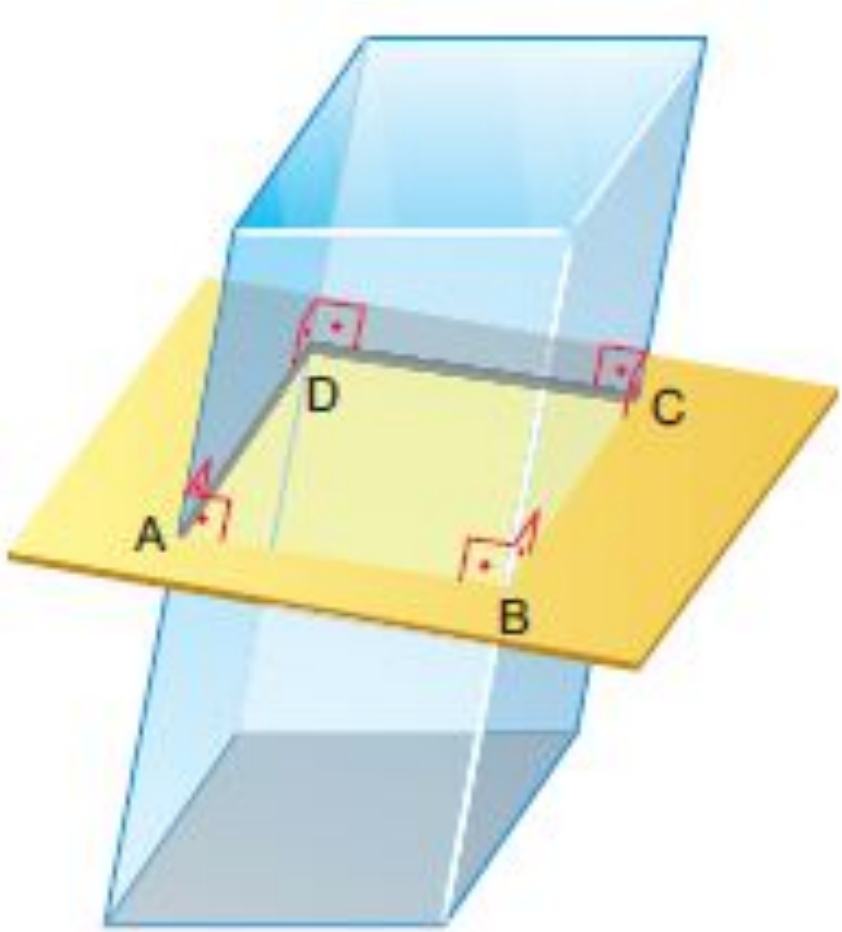


EXAMPLE:

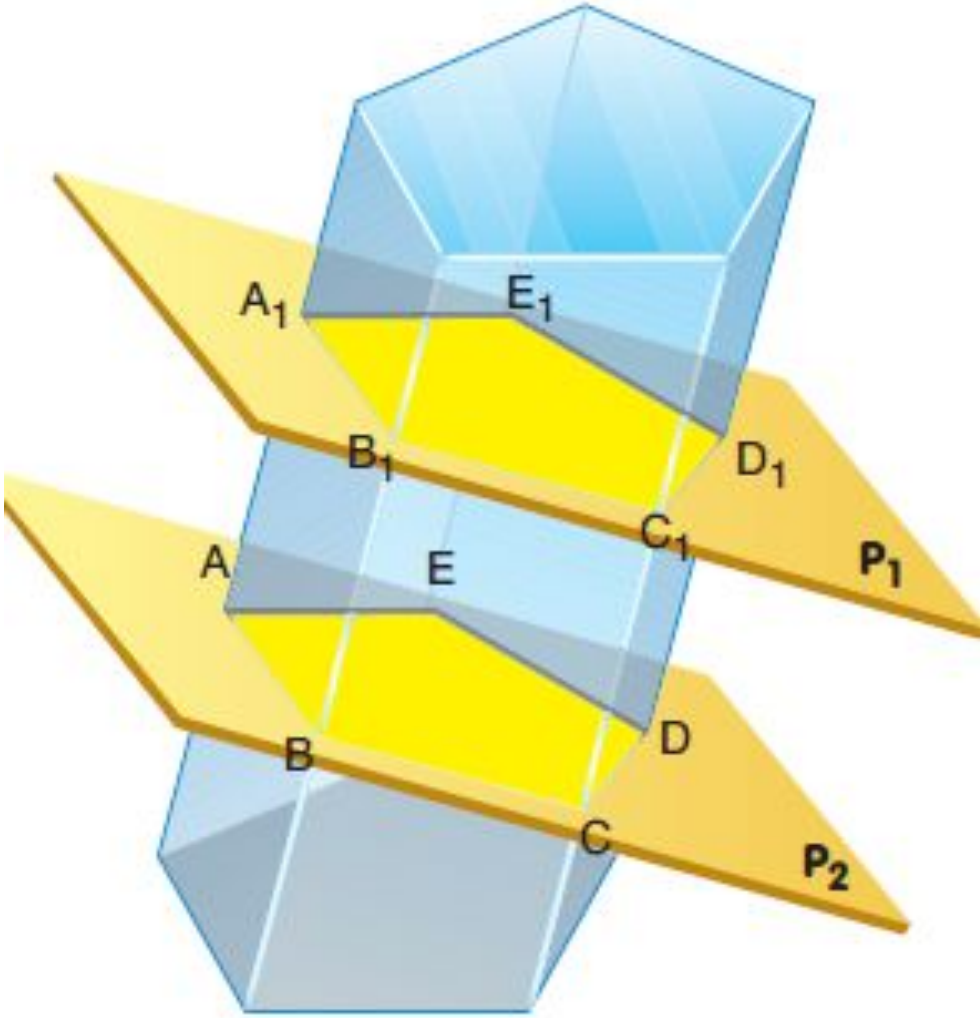
Find the height of an oblique pentagonal prism with 60° inclination if its lateral edge is 8 m.



A **right section** of a prism is a section made by a plane cutting all the lateral edges and perpendicular to them.



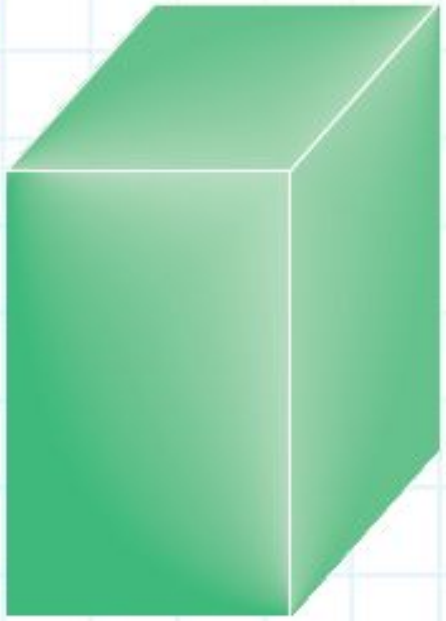
The sections of a prism made by parallel planes cutting all the lateral edges are congruent polygons.



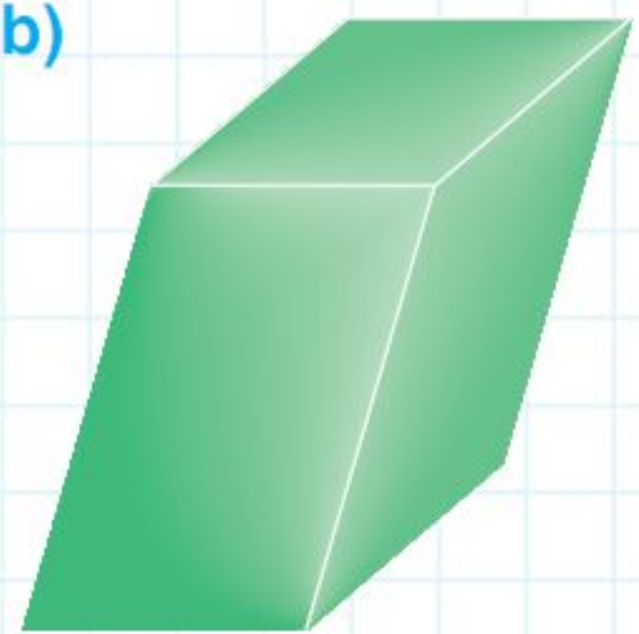
TYPES OF PRISM

A prism whose lateral edges are perpendicular to its bases is called a **right prism,** otherwise it is an **oblique prism.**

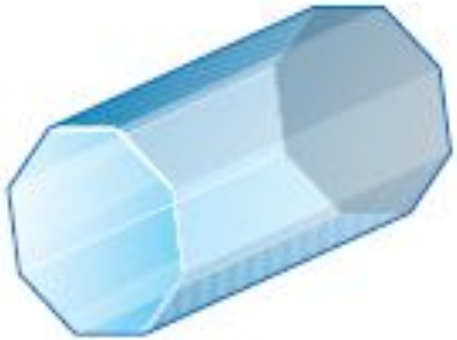
a)



b)



A right prism whose bases are regular polygons is called a **regular prism.**

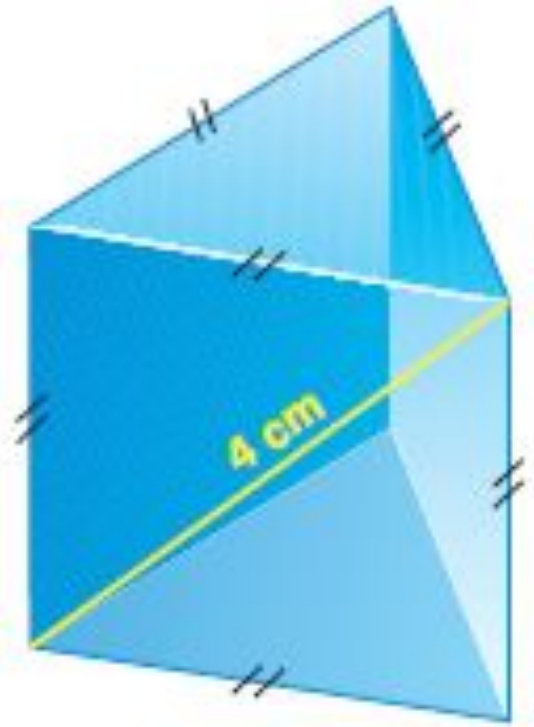


EXAMPLE

The regular hexagonal prism in the figure will be made out of sticks. If the prism has basal edge 5 cm and lateral edge 7 cm, find the total length of all the sticks.

EXAMPLE:

Find the base area of a regular triangular prism if the length of a face diagonal is 4 cm and all the edge lengths are equal.



EXAMPLE:

What is the height of the adjacent oblique prism?