Solution Book of Mathematic

Ssnior 2 Part I

MELVIN CHIA
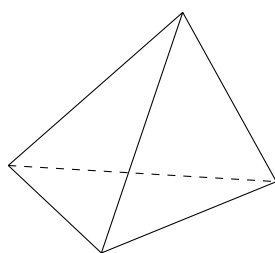
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Chapter 15

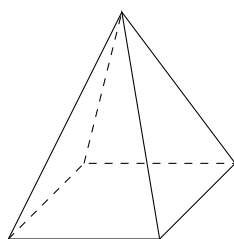# Solid Geometry, Longitude and Latitude

15.1   Solid Geometry

Polyhedron

A polyhedron is a solid bounded by a finite amount of flat polygon, and each side of the polygons must be the common edge of two polygons. Polyhedron can be classified into tetrahedron, pentahedron, hexahedron, etc. based on the number of flat surfaces, aka the *faces* of the polyhedron. The common side of two faces of a polyhedron is called an edge, and the common vertex of three edges is called an *apex*.
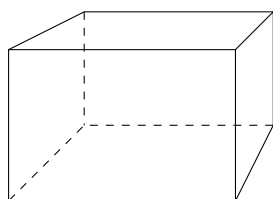
Besides, the angles formed by the faces intersecting at the same vertex are called polyhedral angles or solid angles. The line segment connecting two apexes at different faces is called a *diagonal*.
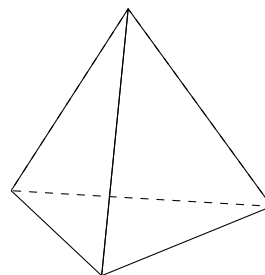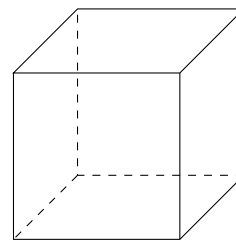

Tetrahedron   Pentahedron

Hexahedron

Regular Polyhedron

A regular polyhedron is a polyhedron with all faces being regular polygons, and all polyhedral angles being equal. The regular polyhedron can be classified into 5 types: regular
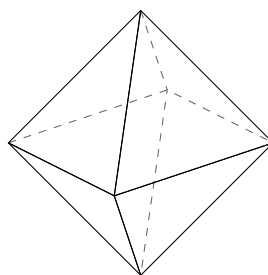
tetrahedron, regular octahedron, regular hexahedron, regular dodecahedron and regular icosahedron.
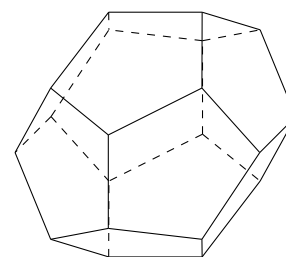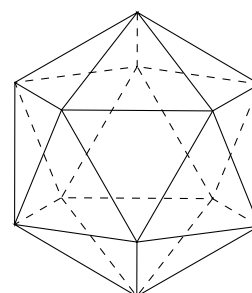

Regular Tetrahedron   Regular Hexahedron

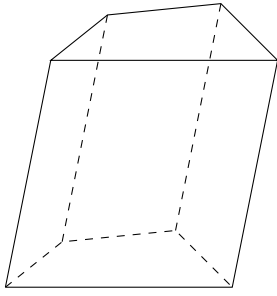Regular Octahedron   Regular Dodecahedron

Regular Icosahedron
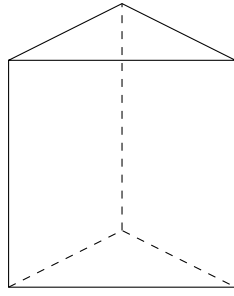
Prism

If two faces of a polyhedron are parallel, while the other faces intersect in sequence to form parallel lines, then the polyhedron is called a prism. The two faces which are parallel to each other are called the bases of the prism, and the other faces are called the lateral faces of the prism. The common sides that two adjacent lateral faces share is called the lateral edges of the prism. The distance between two bases is called the height of the prism.
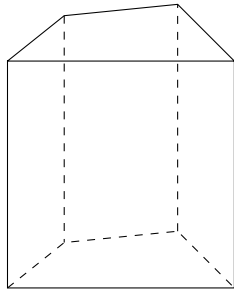
Prism with lateral edges that aren't parallel to each other are called oblique prism; prism with lateral edges that are parallel to each other are called regular prism; regular prism with regular bases are called regular prism.
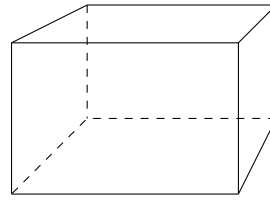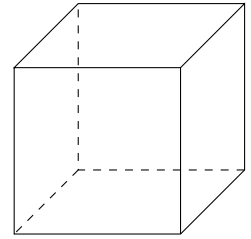
Oblique Prism   Regular Prism

Right Prism

Prism with bases of parallelogram are called parallelepiped. Parallelepiped with lateral edges that are parallel to each other are called right parallelepiped. Right parallelepiped with regular bases are called cuboid, and a cuboid with equal width, height, and depth is called a cube.
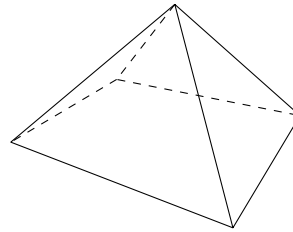

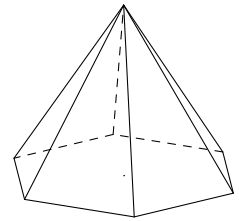
Cuboid   Cube

Pyramid

If a polyhedron has a base and all its lateral faces are triangles that shares a common apex, then the polyhedron is called a pyramid.

If the foot point of a pyramid is the centre of its base, then the pyramid is called a right pyramid. If the base of a right pyramid is a regular polygon, then the pyramid is called a regular pyramid.

Right Pyramid   Regular Pyramid