CHAPTER 7.6

Identify and draw three-dimensional figures.
A **prism** is a three-dimensional figure with at least two parallel, congruent faces called **bases** that are **polygons**. A **pyramid** is a three-dimensional figure with one base that is a polygon. Its other faces are triangles.

**Write prism or pyramid on the line below each figure.**

A plane figure with at least three straight sides and angles
A **plane** is a flat surface that goes on forever in all directions. The figure at the right shows rectangle $ABCD$. Line segments $AB$ and $DC$ are **coplanar** because they lie in the same plane. They are also **parallel** because they will never intersect, no matter how far they are extended.

A set of points, lines, line segments, rays or any other geometrical shapes that lie on the same plane are said to be **coplanar**.
Just as two lines in a plane can intersect or be parallel, there are different ways that planes may be related in space.

Intersect in a Line

Intersect at a Point

No Intersection

These are called parallel planes.
Intersecting planes can form three-dimensional figures. A *polyhedron* is a three-dimensional figure with flat surfaces that are polygons. Prisms and pyramids are both polyhedrons. Some terms associated with three-dimensional figures are *edge*, *face*, *vertex*, and *diagonal*.

**Edge** where two planes intersect in a line

**Face** a flat surface

**Vertex** where three or more planes intersect at a point

**Diagonal** a line segment whose endpoints are vertices that are neither adjacent nor on the same face
There are also solids that are not polyhedrons. A **cylinder** is a three-dimensional figure with two parallel congruent circular bases connected by a curved surface. A **cone** has one circular base connected by a curved side to a single vertex.
In geometry, vertices are a point where two or more curves, lines, or edges meet. As a consequence of this definition, the point where two lines meet to form an angle is known as a vertex.
Identify the figure. Name the bases, faces, edges, and vertices.

The figure has one base that is a pentagon, so it is a pentagonal pyramid.

- **base:**
- **faces:**
- **edges:**
- **vertices:**
Examples

Identify the figure. Name the bases, faces, edges, and vertices.

3. The figure has rectangular bases that are parallel and congruent, so it is a rectangular prism.

bases: \(ABCD\) and \(EFGH\), \(ABFE\) and \(DCGH\), \(ADHE\) and \(BCGF\)

faces: \(ABCD\), \(EFGH\), \(ABFE\), \(DCGH\), \(ADHE\), \(BCGF\)

edges: \(\overline{AB}, \overline{BC}, \overline{CD}, \overline{AD}, \overline{EF}, \overline{FG}, \overline{GH}, \overline{EH}, \overline{AE}, \overline{BF}, \overline{CG}, \overline{DH}\)

vertices: \(A, B, C, D, E, F, G, H\)

Common Error
In the drawing of a rectangular prism, the bases do not have to be on the top and bottom. Any two parallel rectangles are bases. In a triangular pyramid, any face is a base.
Practice Problem

da. Figure name:

base:

faces:

edges:

vertices:
The intersection of a solid and a plane is called a **cross section** of the solid.
Describe the shape resulting from a vertical, angled, and horizontal cross section of a square pyramid.

**Vertical Slice**
The cross section is a

**Angled Slice**
The cross section is a

**Horizontal Slice**
The cross section is a
Practice Problem

Describe the shape resulting from a vertical, angled, and horizontal cross section of a cylinder.
Practice Problem

Identify the figure. Then name the bases, faces, edges, and vertices.

Figure name:

bases:

faces:

edges:

vertices:
Describe the shape resulting from the cross section shown.