LESSON
11.1

The Geometry of Solids

Learning Targets:

a. I can identify parts of geometric solids

b. I can classify geometric solids
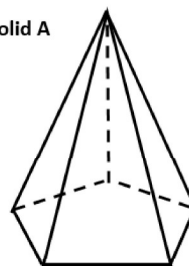
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Launch

Describe the similarities and differences between the two geometric solids.
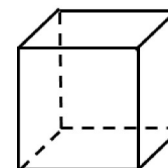
<u>Similarities</u>
- Both are 3-D
- made from polygons
- Both have bases

Solid A   Solid B

<u>Differences</u>
- made from different polygons
- different # of points

LESSON

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The Geometry of Solids

Most of the geometric figures you have worked with so far have been flat plane figures with two dimensions—base and height. In this chapter you will work with solid figures with three dimensions—length, width, and height. Most real-world solids, like rocks and plants, are very irregular, but many others are geometric. Some real-world geometric solids occur in nature: viruses, oranges, crystals, the earth itself. Others are human-made: books, buildings, baseballs, soup cans, ice cream cones.

This amethyst crystal is an irregular solid, but parts of it have familiar shapes.

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Lesson 11.1 The Geometr

## Can you think of other real-world geometric solids?

Polyhedron: A geometric solid formed by polygons that enclose a single region of space. A polyhedron has no curved surfaces.

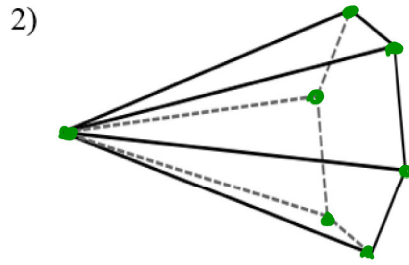We can describe polyhedrons by identifying its number of faces, edges, and vertices.

Face: The *polygonal* surface of a polyhedron   1)

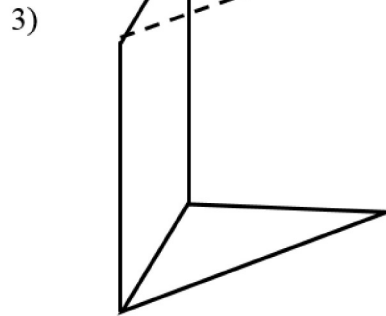**Edge**:   The *segment* where two faces of a polyhedron intersect

Vertex: The *point* where three or more edges of a polyhedron intersect.
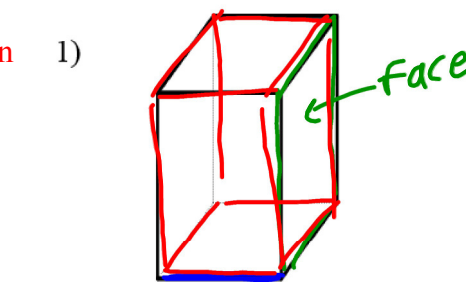
face

edge

Number of Faces _____6_____

Number of Edges _____12_____

Number of Vertices _____8_____

2)

3)

Number of Faces ___7___   Number of Faces ___5___

Number of Edges ___12___   Number of Edges ___9___

Number of Vertices ___7___   Number of Vertices ___6___

A **Prism** is a polyhedron that has TWO BASES that are congruent and parallel, and surfaces which are all polygons. It has lateral faces that are parallelograms (in our class, they will be rectangles).

For each prism, Outline the Bases
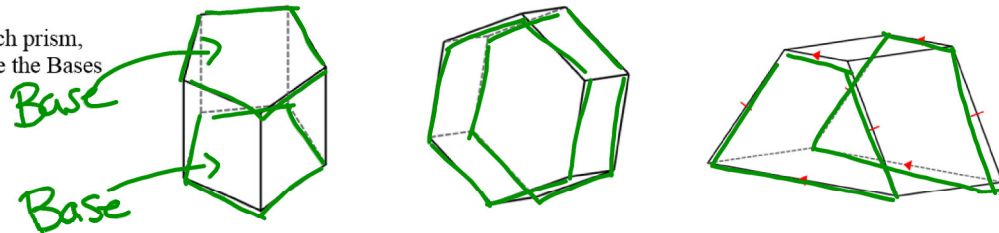
Base

Base

A **Pyramid** is a polyhedron that has ONE BASE. It has lateral faces that are triangles. It also has a vertex where the lateral faces meet which is called the apex of the pyramid.

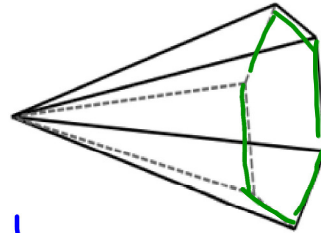For each pyramid,
- Label the apex
- Outline the Base

Apex

Apex

Apex
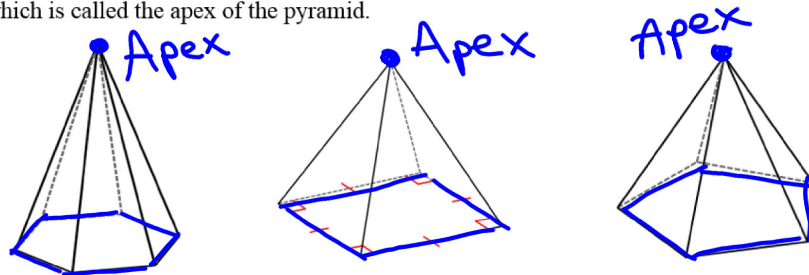
A polyhedron is named by the shape of its Base and its type - Prism or Pyramid.
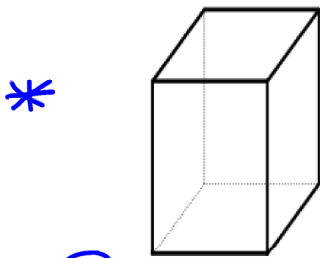
Name the following polyhedrons:
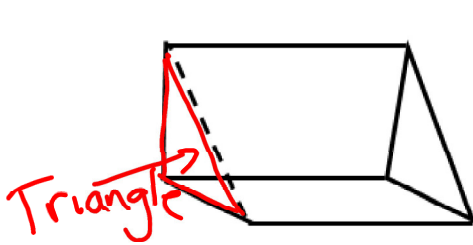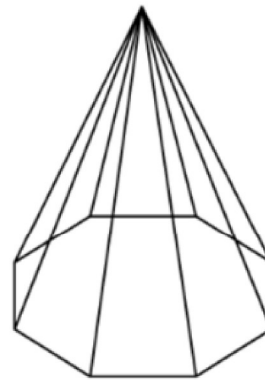
Triangle

Triangular
prism

hexagonal
pyramid

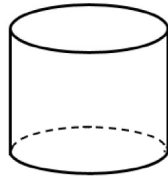Name the following polyhedrons:

*
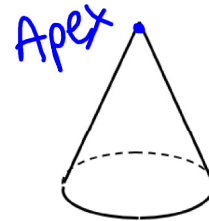
Rectangular
prism

octagonal
pyramid

Examples of Non-polyhedrons

*There are also geometric solids that have curved surfaces.*

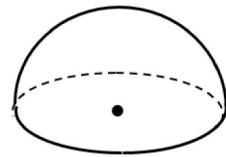A **Cylinder** is a curved solid that has TWO BASES are congruent, parallel and circular.

A **Cone** is a curved solid that has ONE BASE that is circular. It has one vertex called the apex.

Apex

A **Sphere** is the set of all points in a space at a given distance from a given point. It can be thought of as a a three-dimensional circle.
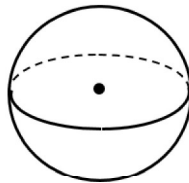
A **Hemisphere** is half of a sphere, and its circular BASE.

Practice:

Use Figure A to answer the questions #1-5.

1) Name the solid ___Pentagonal prism___

2) The solid has ___7___ total faces; it has

___2___ Base(s) and ___5___ lateral face(s).

3) Name each base ___Pentagon ABCDE + Pentagon FGHIJ___

4) How many edges does the solid have? ___15___
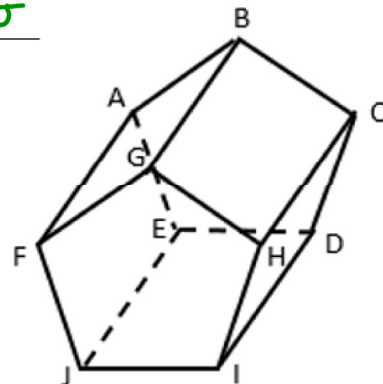
5) How many vertices does the solid have? ___10___

Figure A

Use Figure B to answer the questions #6-10.

6) Name the solid ___*Square pyramid*___

7) The solid has ___*5*___ total faces; it has

___*1*___ Base(s) and ___*4*___ lateral face(s).

8) Name each base ___*Square BCDE*___

9) How many edges does the solid have? ___*8*___

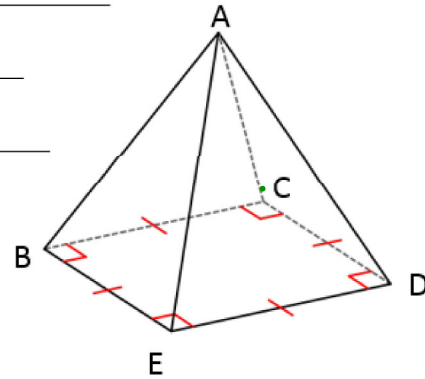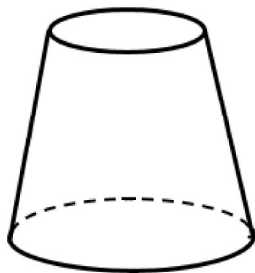10) How many vertices does the solid have? ___*5*___

Figure B

11) Is this a cylinder or a cone or neither? Explain.

Neither. not a cone because there is no apex. not a cylinder because the "bases" are not ≅

Assignment:

11.1 and 1.8 Geometry of Solids Homework Day 1