EXPLORING SOLIDS & CROSS-SECTIONS NOTES
GEOMETRY

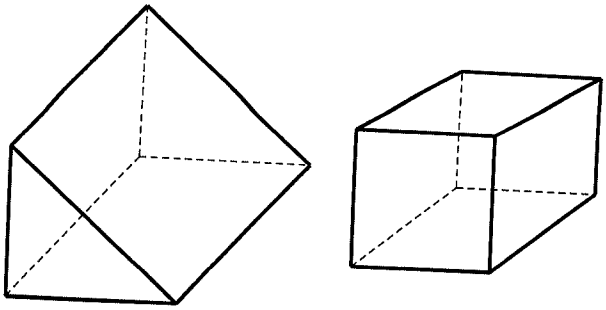
NAME: _____
DATE: _____ **PERIOD:** ___

Learning Targets:
- ✓ Explore and name various solids
- ✓ Identify edges, faces, and vertices of a figure
- ✓ Use Euler's Formula to determine the number of vertices, faces, or edges
- ✓ Describe the cross-section of a plane and a solid
- ✓ Rotate a two-dimensional figure about an axis to create a three-dimensional figure

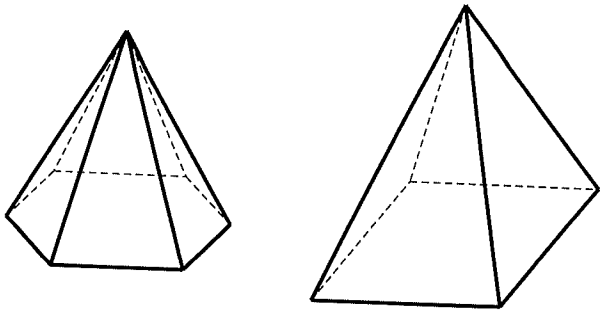
- A **polyhedron** is a _____ that is bounded by _____, called **faces**, that enclose a single region of _____.
- An **edge** of a polyhedron is a _____ segment formed by the _____ of two _____.
- A **vertex** of a polyhedron is a _____ where three or more _____ meet.
- The plural of polyhedron is *polyhedra*, or polyhedrons.

FAMILIES OF SOLIDS

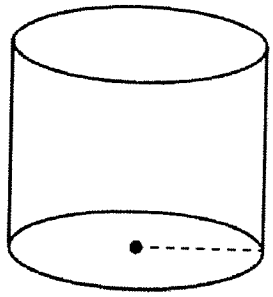
Name: _____
POLYHEDRA



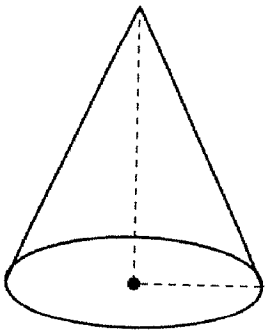
Name: _____
POLYHEDRA



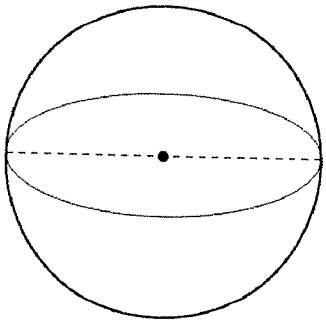
Name: _____
NOT A POLYHEDRON



Name: _____
NOT A POLYHEDRON



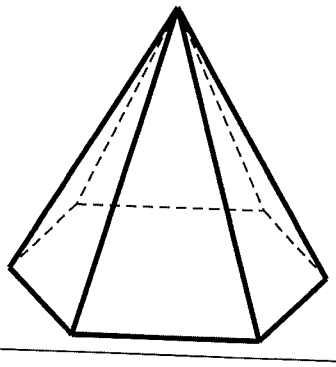
Name: _____
NOT A POLYHEDRON



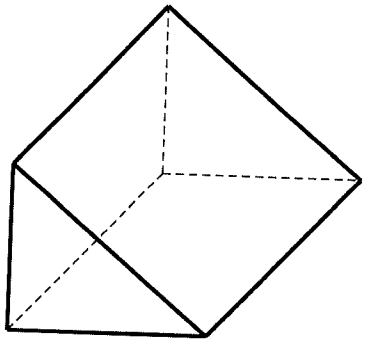
1) Why are the "circular solids" above NOT considered polyhedra?

For #s 2–3, name the figure, count the number of faces, edges, and vertices of each polyhedron.

2) Name: _____
Faces: _____ Edges: _____ Vertices: _____



3) Name: _____
Faces: _____ Edges: _____ Vertices: _____



Euler's Theorem
(also known as **Euler's Formula**)

_____

where,
V= # of **vertices** of the polyhedron
F= # of **faces** of the polyhedron
E= # of **edges** of the polyhedron

For #s 4–5, use Euler's Theorem to answer the questions.

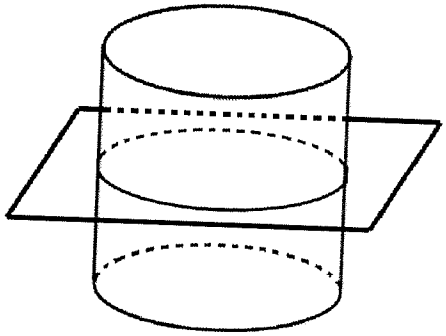
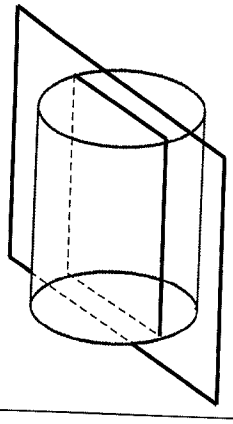
4) If a solid has 8 **faces** and 12 **vertices**, how many **edges** will it have?

5) If a solid has 8 **faces** and 12 **edges**, how many **vertices** will it have?

You Try!
#6

If a solid has 14 faces and 36 edges, how many vertices will it have?

✸ A **cross-section** is the _____ of a _____ figure and a _____.

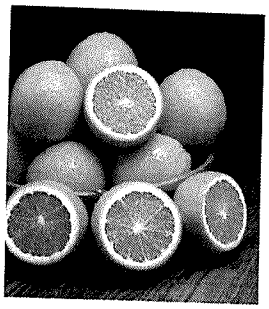
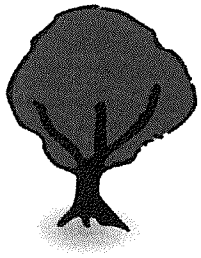
Cross-Section A: Parallel to the Base	**Cross-Section B: Perpendicular to the Base**
	
Cross-Section A is in the shape of a _____. *Any cross-section made parallel to the base of a prism/cylinder will have the same shape as the base of the figure.*	Cross-Section B is in the shape of a _____. *Since the bases of the cylinder meet the lateral face (the curved surface) at a right angle, the vertical cross-section must also contain four right angles.*

Discuss:

✓ Why does the cross-section in A *appear* to be an oval or ellipse?

✓ Is it possible for a cross-section of a cylinder to have a shape other than those identified above?

For #s 7–10, describe the <u>vertical</u> cross-section of each item (perpendicular to the "base").

7) _____  (Orange)	**8)** _____  (Tree Trunk)
9) _____  (Ice Cream Cone)	**10)** _____  (Mango)