Geometry

Mrs. Tilus

Unit 12: Surface Area and Volume of Solids

Priority Standard:

Unit 8 "I can" Statements:

1. I can find identify solids
2. I can find the area of parallelograms
3. I can find the area of squares
4. I can find the area of rectangles
5. I can find the area of trapezoids
6. I can find the area of kites
7. I can find the circumference of circles
8. I can find the arc measure and arc lengths of circles
9. I can find the area of circles
10. I can find the area of a sector of a circle
11. I can find the area of any regular polygon
12. I can find geometric probability using lengths and areas.

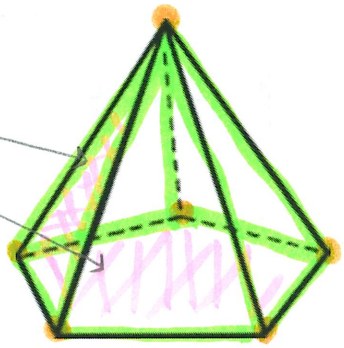
Chapter 12.1: Explore Solids

Polyhedron: A solid that is bounded by polygons ← Shapes with straight edges that enclose a single region of space.

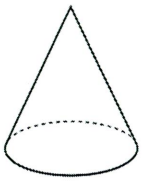
Face: The flat surfaces of the 3-D shape (2-D polygons) Example: 5-Triangles 1-Pentagon

Edge: A line formed by the intersection of two faces. Example: 10 edges

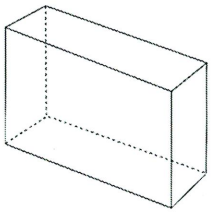
Vertex: A point where three or more edges meet. Example: 6 Vertices



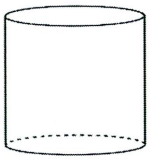
Types of Solids: ~~Which~~ Are the following solids ~~are~~ polyhedrons?



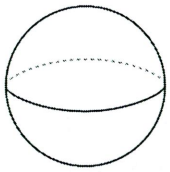
No (curved edge)



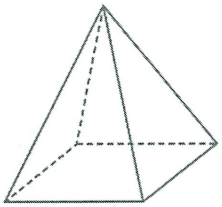
Yes



No (curved edge)



No



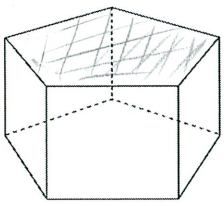
Yes

Classifying Solids: To name a prism or a pyramid, use the shape of the base.

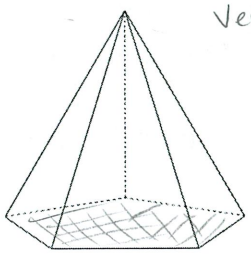
Prism: joins corresponding vertices of two parallel bases.

There are 2 sides with the same shape that are parallel

Pyramid: has one base whose vertices are connected @ a single point.



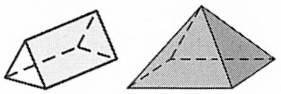
Pentagonal Prism



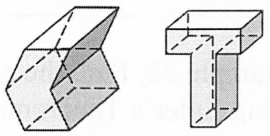
Pentagonal Pyramid

lar Polyhedrons: A polyhedron is regular if all of its faces are congruent regular polygons.

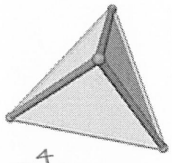
- A polyhedron is **convex:** if any two points on its surface can be connected by a segment that lies entirely inside or on the polyhedron.



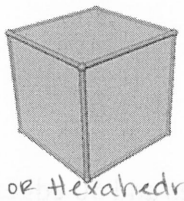
- A polyhedron is **concave:** if two points on its surface is connected by a segment that goes outside the polyhedron.



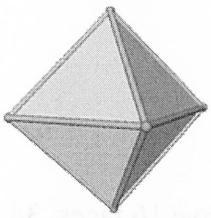
There are 5 regular polyhedra called Platonic Solids



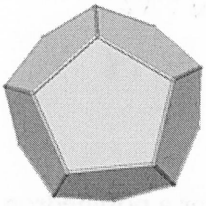
4
Tetrahedron
4-sides



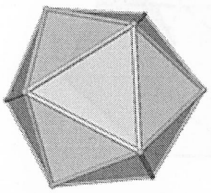
or Hexahedron
Cube
6-sides



Octahedron
8-sides



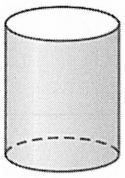
Dodecahedron
12-sides



Icosahedron
20-sides

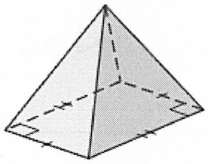
Example #1: Tell whether the solid is a polyhedron. If it is, name the polyhedron and find the number of faces, vertices and edges.

a.)



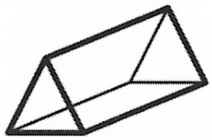
No-(Cylinder)

b.)



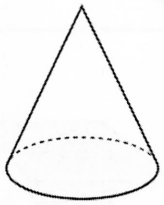
Yes - Rectangluar Pyramid

c.)



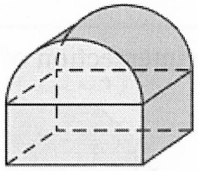
Yes - Triangular Prism

d.)



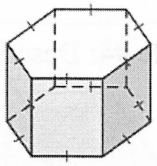
No-(Cone)

e.)



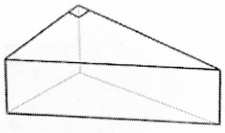
No

f.)



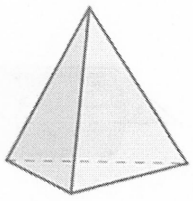
Yes - Hexagonal Prism

g.)



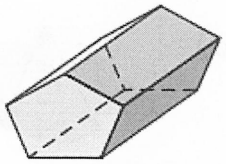
Yes - Triangular Prism

h.)



Yes - Triangular Pyramid

i.)

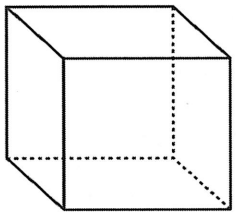


Yes - Pentagonal Prism

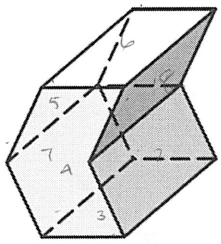
Euler's Theorem (Theorem 12.1):

The number of faces (F), vertices (V) and edges (E) of a Polyhedron are related by the formula…

$F + V = E + 2$



Example #2: Find the number of faces, vertices and edges of the polyhedron shown. Check your answers using Euler's Theorem.



F: 8

V: 12

E: 18

V: $8 + 12 = 18 + 2$

Example #3: Is it possible for a polyhedron to have 16 faces, 34 vertices and 50 edges?

$F + V = E + 2$

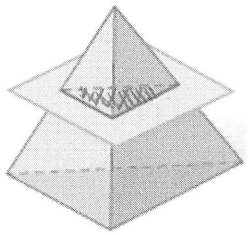
$16 + 34 = 50 + 2$

$50 \neq 52$ No; it is not possible

Cross Section: the intersection of a Solid (3-D shape)

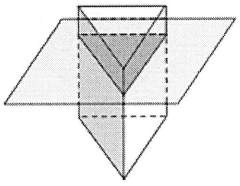
and a plane.

It will create a 2-D shape.



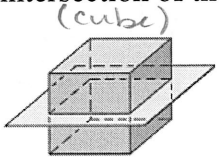
Example #4: Describe the shape formed by the intersection of the plane and the solid.

a.)



Triangle

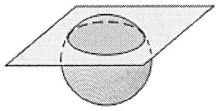
b.)



(cube)

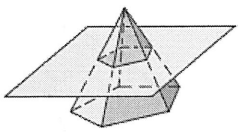
Square

c.)



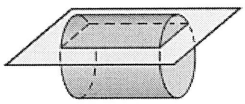
Circle

d.)

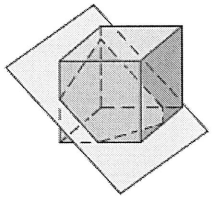


Pentagon

e.)



Rectangle



Trapezoid