Warm Up

Name the polygon by the number of sides.

1. 6-gon   2. 10-gon   3. 5-gon

Hexagon   *Decagon*   *Pentagon*

4. What is a regular polygon?

12-1   Solids

Polyhedron -

Polyhedra

Prism

Pyramid

Not Polyhedra

Cylinder   Cone

Sphere

Face -   flat side
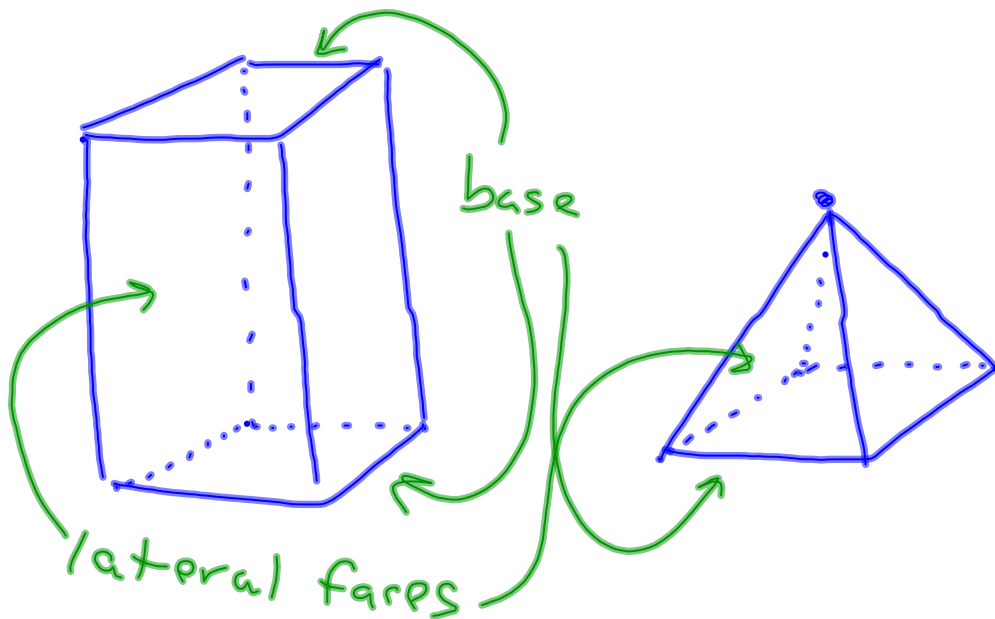
Edge -   segment

Vertex -   corner

Regular -   congruent edges
             congruent faces

Convex -
             no dents

Prism   ## Pyramid

base

lateral faces

Euler's Theorem - $$F + V = E + 2$$

FACES   VERTICES   EDGES

Ex. 1   Demonstrate that Euler's Theorem holds true for the prism and pyramid drawn on the previous slide.

$$6 + 8 = 12 + 2$$

$$5 + 5 = 8 + 2$$

Leonhard Euler
1707 – 1783 A.D.

Leonhard Euler   1707 – 1783 A.D.
Basel, Switzerland

Born in Basel, Switzerland, Leonhard Euler spent much of his life in St. Petersburg and Berlin. At the age of 13 he attended the University of Basel where he received a masters of philosophy with a dissertation comparing philosophies of Descartes and Newton. Soon later, Euler would move to St. Petersburg accepting a position in the math department at the Academy of St. Petersburg and also a position as a medic in the Russian Navy. Euler later moved to Berlin in accordance with the offered post at Berlin Academy from Frederick the Great. He toggled between these two cities, until his death on September 7, 1783 in St. Petersburg. He married twice and had 13 children, but only five lived past their youth. Euler's works total to 886 papers and books that fill over 90 volumes. Astonishingly enough, most of this work came from his last two decades of life, where his eyesight deteriorated until he was blind.
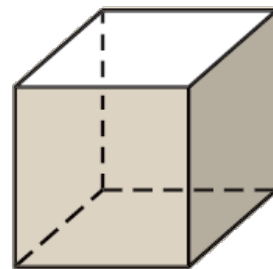
Major Works:
Euler-Catchy Equation, Euler-Lagrange Equation, Euler's Formula Euler-Maclaurin Formula, Euler Prime, Euler-Fermat Theorem

Ex. 2   Find the number of faces, vertices, and edges of
             the polyhedron. Check your answer using
             Euler's Theorem.
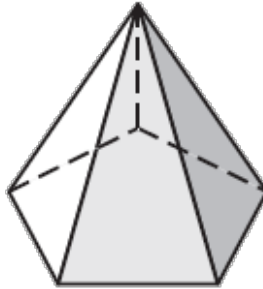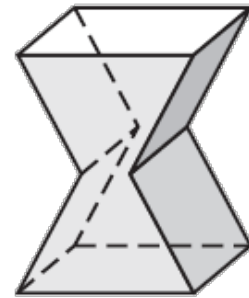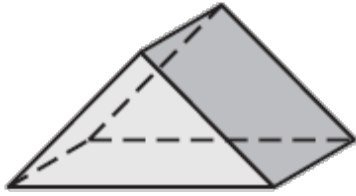
Ex. 3   Tell whether the solid is a polyhedron. If it is,
             name the polyhedron and find the number of faces,
             vertices, and edges.

Platonic solids - regular polyhedra (there are five of them)
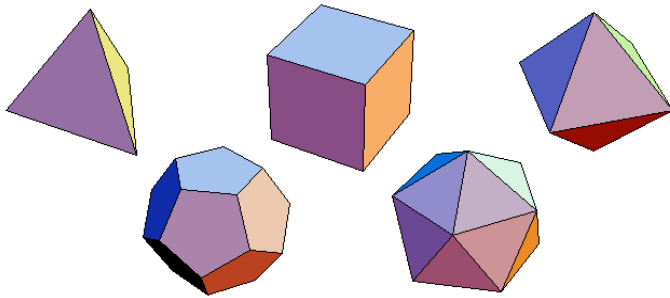
  tetrahedron - 4 faces

  cube - 6 faces

  octahedron - 8 faces

  dodecahedron - 12 faces

  icosahedron - 20 faces

Ex. 4   Describe the shape formed by the intersection of a plane and the cylinder.