Bellwork
05/07/12

Name the polygon by the number of sides.

1. **6** hexagon
2. **10** decagon
3. **5** Pentagon
4. **What is a regular polygon?**

   Equilateral
   Equiangular

Geometry
12.1 Explore Solids
Standard(s): 3

Vocabulary:

Polyhedron: A solid bounded by polygons (called faces).

Edge: A line segment formed by the intersection of two faces.

Vertex: A point where three or more edges meet.

Regular: All faces are congruent regular polygons.

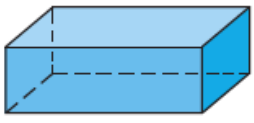
Convex: All sides point outwards.

Concave: Any side caves inwards.

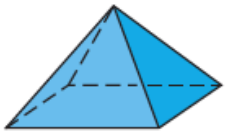
KEY CONCEPT *For Your Notebook*

Types of Solids

Polyhedra

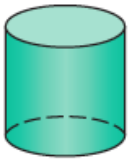


Prism



Pyramid

Not Polyhedra



Cylinder

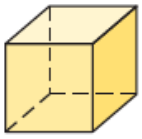
Cone

Sphere

THEOREM *For Your Notebook*

THEOREM 12.1 Euler's Theorem

The number of faces (F), vertices (V), and edges (E) of a polyhedron are related by the formula $F + V = E + 2$.



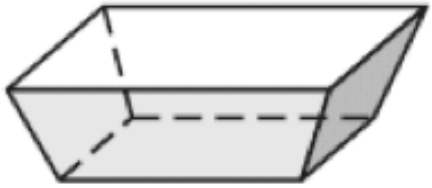
$F = 6, V = 8, E = 12$

$6 + 8 = 12 + 2$

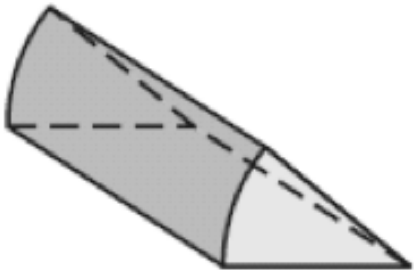
Faces + Vertices = Edges + 2

Polyhedron or No?

Determine whether the solid is a polyhedron or not.



Yes!



No!

Euler's Theorem

Use Euler's Theorem to find the value of *n*.

Faces: 5
Vertices: 6
Edges: *n*

$F+V=E+2$

$5+6=n+2$

$11=n+2$

$n=9$ e.

Faces: 8
Vertices: n
Edges: 18

$8+n=18+2$

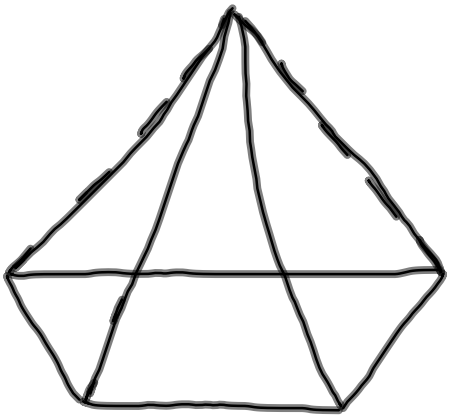
$8+n=20$

$n=12$ v.

Sketch a Polyhedron

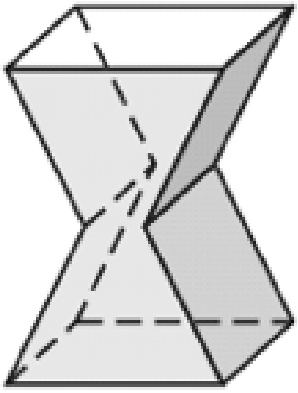
Sketch the polyhedron.

Trapezoidal Pyramid



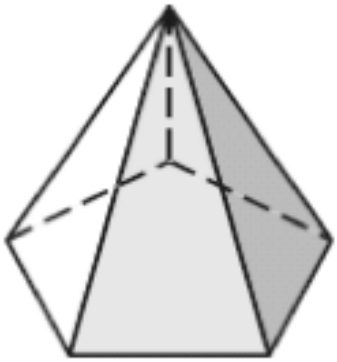
Describe a Polyhedron

Find the number of faces, vertices, and edges of the polyhedron. Check your answer using Euler's Theorem.



8 f.
12 v.
18 e.

$8 + 12 = 18 + 2$
$20 = 20$ ✓

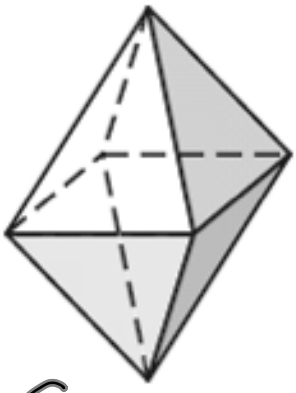


6 f.
6 v.
10 e.

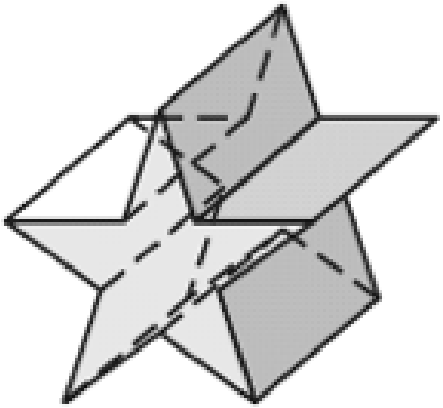
$6 + 6 = 10 + 2$
$12 = 12$ ✓

Convex or Concave?

Describe the polyhedron as *convex* or *concave*?



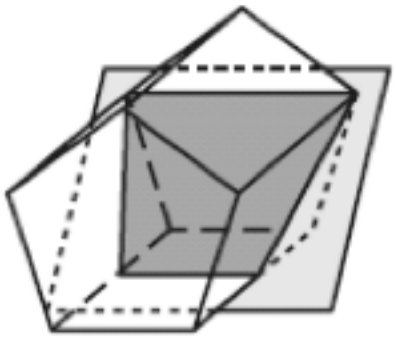
Convex



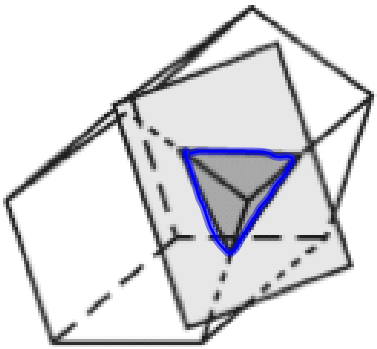
Concave

Conic Sections

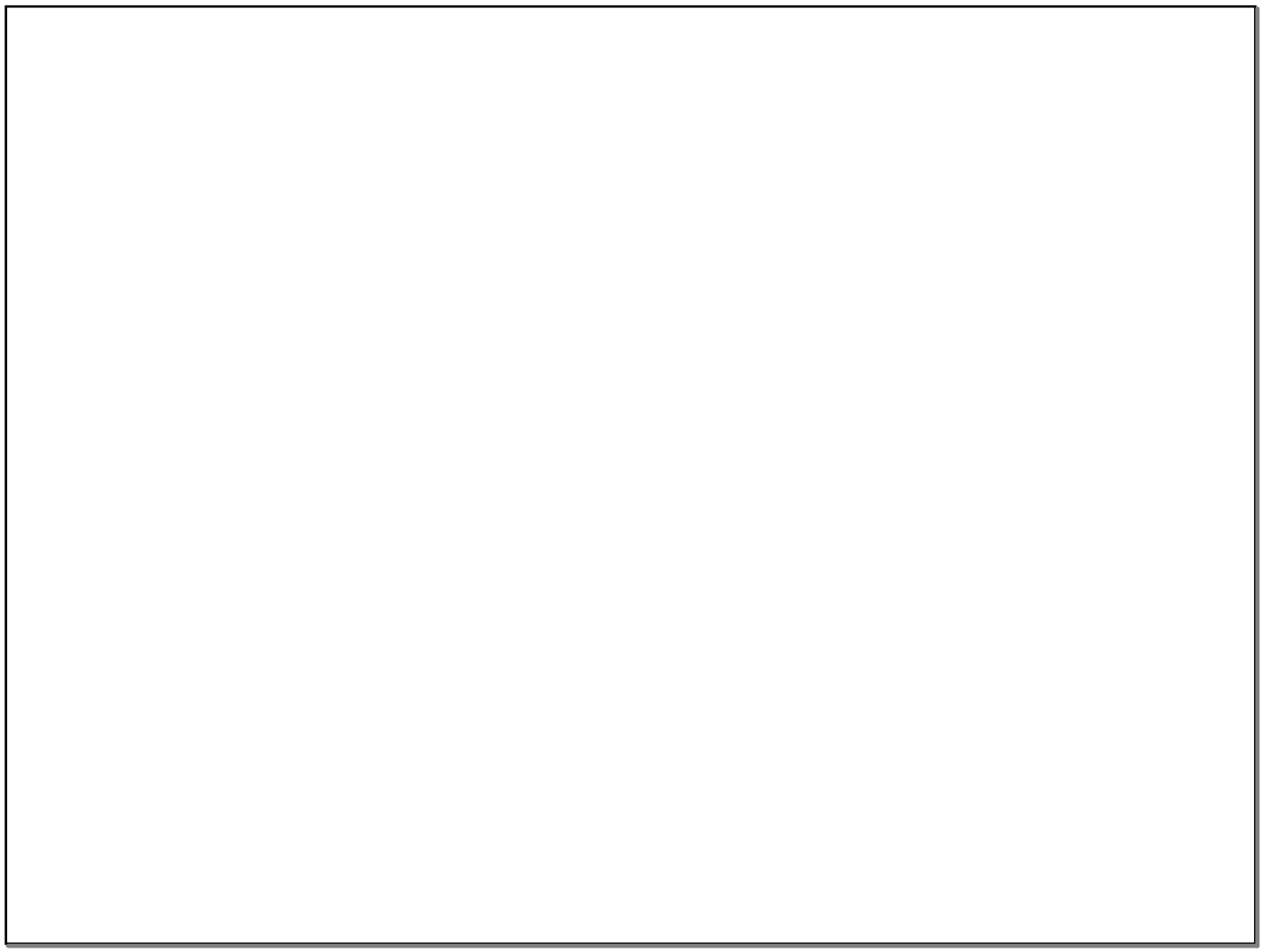
Describe the cross section formed by the intersection of the plane and the pentagonal prism.



Trapezoid



Triangle

Homework Assignment

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