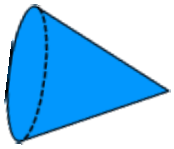
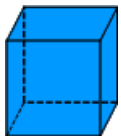
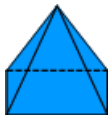
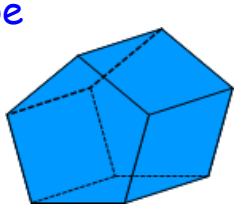
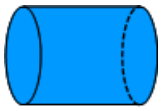
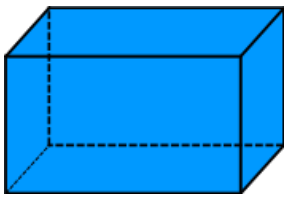
11-1 Solid Geometry

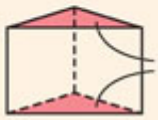
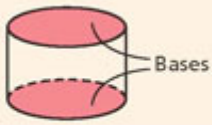
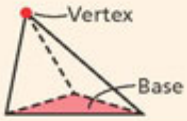
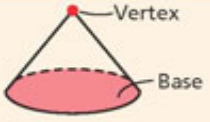
Three-dimensional figures, or _____, can be made up of flat or curved surfaces.
Each flat surface is called a _____.
An _____ is the segment that is the intersection of two faces.
A _____ vertex is the point that is the intersection of three or more faces.

Label each part of the rectangular prism:



Face
Edge
Vertex

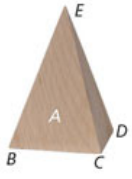
Three-Dimensional Figures

TERM	EXAMPLE
A _____ is formed by two parallel congruent polygonal faces called *bases* connected by faces that are parallelograms.	
A _____ is formed by two parallel congruent circular bases and a curved surface that connects the bases.	
A _____ is formed by a polygonal base and triangular faces that meet at a common vertex.	
A _____ is formed by a circular base and a curved surface that connects the base to a vertex.	

1 Classifying Three-Dimensional Figures

Classify each figure. Name the vertices, edges, and bases.

A



name_____
vertices_____
edges_____
bases_____

B

name_____
vertices_____
edges_____
bases_____

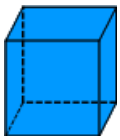
Cool Fact

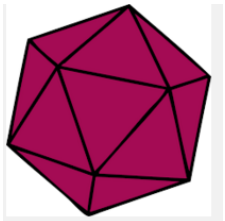
Euler's Formula

The sum of the number of faces and vertices of a polyhedra is _____ more than the number of edges.

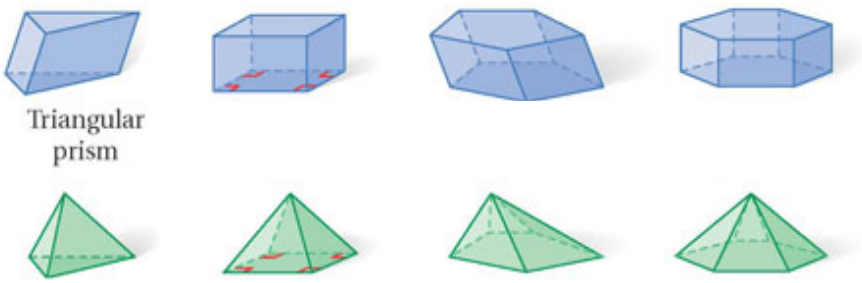
Fill in the chart:

Faces	Edges	Vertices
	15	9
20	30	
8		12





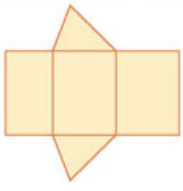
Ex 2: Name each solid, first on is done for you.



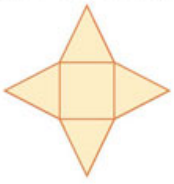
3 **Identifying a Three-Dimensional Figure From a Net**

Describe the three-dimensional figure that can be made from the given net.

A

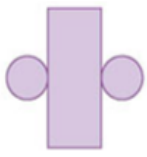


B

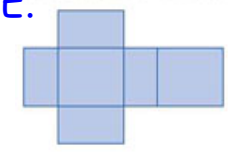


C.

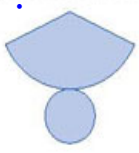
D.



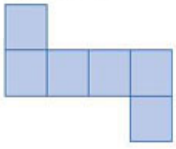
E.



F.



G.

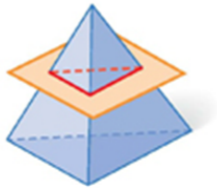


A _____ is the intersection of a 3-D figure and a plane.

4 **Describing Cross Sections of Three-Dimensional Figures**

Describe each cross section.

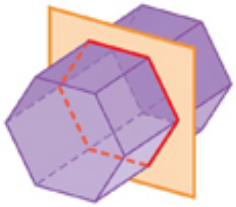
A



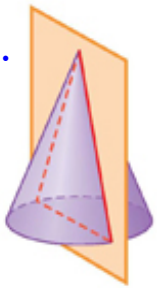
B

Describe each cross section.

C.

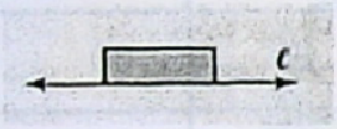


D.

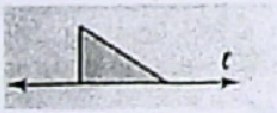


Ex 5: A plane region that revolves completely about a line sweeps out a solid of revolution. Describe the solid of revolution for each region about the line.

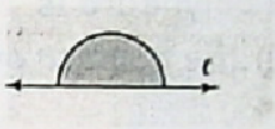
a.



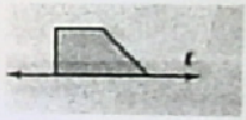
b.



c.



d.



Use these helpful hints to help you draw each:

PRISM

Draw two parallelograms, one above the other. Make two sides of the lower one dashed.

Draw segments connecting the vertices of the parallelograms. Use a dashed segment for the hidden edge.

Ex 1: A hexagonal based prism

PYRAMID

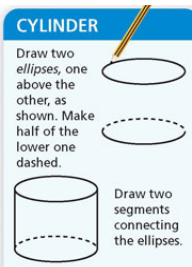
Draw a parallelogram and a point above it. Make two sides of the parallelogram dashed.

Draw segments connecting the vertices of the parallelogram to the point. Use a dashed segment for the hidden edge.

Ex 2: A hexagonal based pyramid

CYLINDER

Draw two *ellipses*, one above the other, as shown. Make half of the lower one dashed.

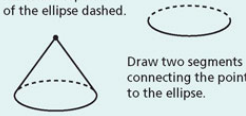


Draw two segments connecting the ellipses.

Ex 3: A cylinder

CONE

Draw an ellipse and a point above it. Make the top half of the ellipse dashed.

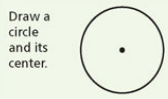


Draw two segments connecting the point to the ellipse.

Ex 4: A cone

SPHERE

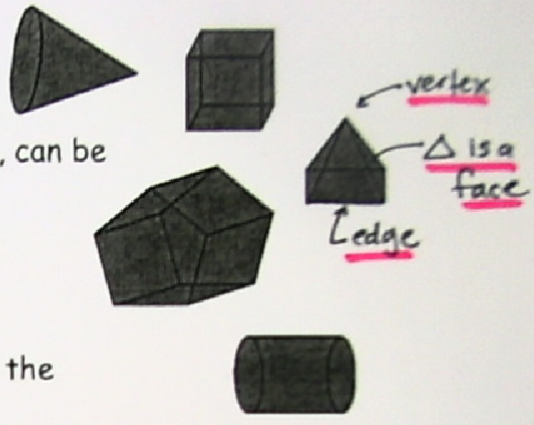
Draw a circle and its center.



Draw an ellipse inside the circle. Make the top half of the ellipse dashed.

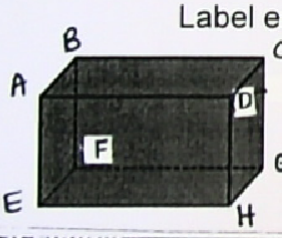
Ex 5: A sphere

11-1 Solid Geometry

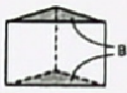
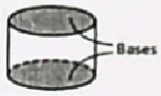
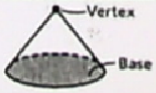


Three-dimensional figures, or solids, can be made up of flat or curved surfaces.
Each flat surface is called a face.
An edge is the segment that is the intersection of two faces.
A vertex is the point that is the intersection of three or more faces.

Label each part of the rectangular prism:



Total
6 Faces ABCD, EFGH, ABFE, DCGH, ADHE, BCGF
12 Edges AB, BC, CD, AD, FG, GH, EH, EF, AE, BF, DH, CG
8 Vertices A, B, C, D, E, F, G, H

TERM	EXAMPLE
A prism is formed by two parallel congruent polygonal faces called *bases* connected by faces that are parallelograms.	
A cylinder is formed by two parallel congruent circular bases and a curved surface that connects the bases.	
A pyramid is formed by a polygonal base and triangular faces that meet at a common vertex.	
A cone is formed by a circular base and a curved surface that connects the base to a vertex.	

1 Classifying Three-Dimensional Figures

Classify each figure. Name the vertices, edges, and bases.

A

name Square based pyramid
5 vertices A, B, C, D, E
8 edges AD, DC, BC, AB, ED, EC, EB, EA
1 bases ABCD

B

name cylinder
vertices none
edges none
bases 2 circles OP and OQ

Cool Fact

Euler's Formula

The sum of the number of faces and vertices of a polyhedra is 2 more than the number of edges.

$F + V = 2 + E$

or

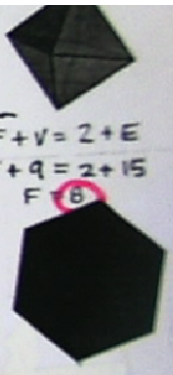
$F + V - E = 2$

Fill in the chart:

Faces	Edges	Vertices
8	15	9
20	30	12
8	18	12

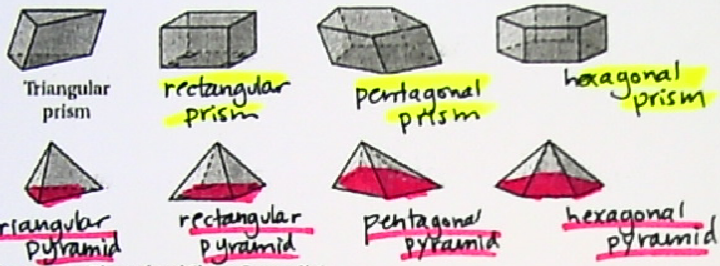
$F + V = 2 + E$
$20 + V = 2 + 30$
$20 + V = 32$

$F + V = 2 + E$
$8 + 12 = 2 + E$
$20 = 2 + E$



$F + V = 2 + E$
$F + 9 = 2 + 15$
$F = 8$

Ex 2: Name each solid, first on is done for you. ★ name by its base shape ★



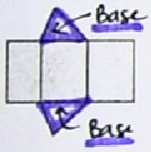
Triangular prism — rectangular prism — pentagonal prism — hexagonal prism

triangular pyramid — rectangular pyramid — pentagonal pyramid — hexagonal pyramid

3 **Identifying a Three-Dimensional Figure From a Net**

Describe the three-dimensional figure that can be made from the given net.

A



2 bases → prism

triangular prism

B

1 base

square based pyramid

C.

1 base

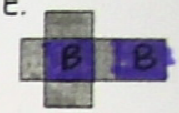
triangular pyramid

D.

2 ⊙ bases

cylinder

E.



2 bases

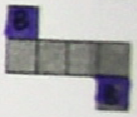
rectangular prism

F.

1 base

cone

G.



2 □ bases

cube

A ___Cross section___ is the intersection of a 3-D figure and a plane.

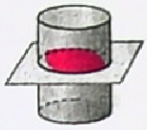
4 **Describing Cross Sections of Three-Dimensional Figures**

Describe each cross section.

A

triangle

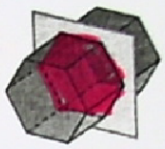
B



circle

Describe each cross section.

C.



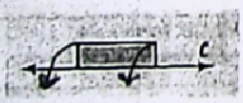
hexagon

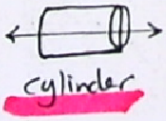
D.

triangle

Ex 5: A plane region that revolves completely about a line sweeps out a solid of revolution. Describe the solid of revolution for each region about the line.

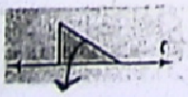
a.

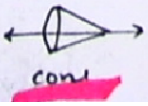




cylinder

b.



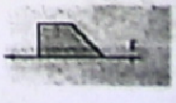


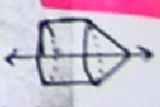
cone

c.

sphere

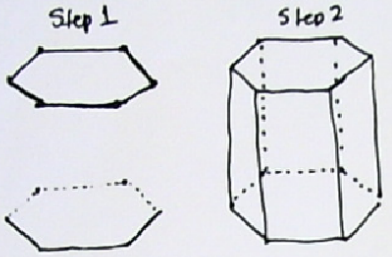
d.



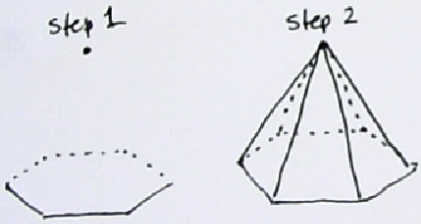


cylinder + cone

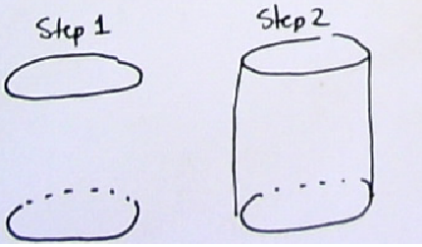
Ex 1:



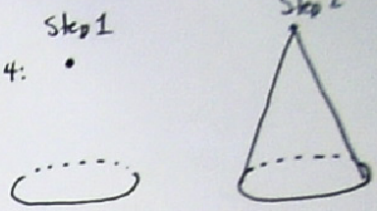
Ex 2:



Ex3:



Ex 4:



Ex5: