Name: Date: Period:

Three-Dimensional Figures

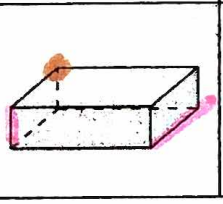
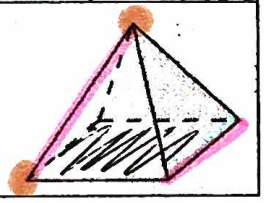
Lesson Objective IWBAT name 3D figures; identify cross sections of 3D figures; describe solids of revolution

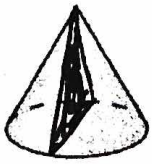
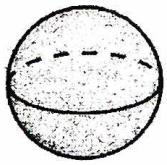
A three-dimensional figure (or solid) is bounded by flat or curved surfaces that enclose a single region of space.

Polyhedron: A polyhedron is a solid that is bounded by polygons, called faces.
→ Plural: "polyhedra" or "polyhedrons"

Edge: The edge of a polyhedron is a segment formed by the intersection of two faces.

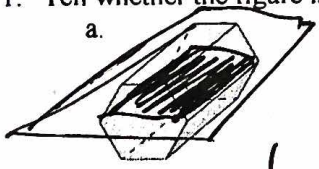
Vertex: A vertex of a polyhedron of a point where three or more faces meet.

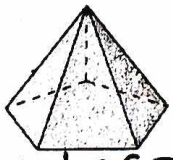
Polyhedra	
Prism	*Pyramid*
	

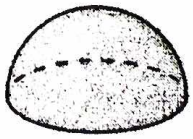
Not Polyhedra		
Cylinder	*Cone*	*Sphere*
		

To name a prism or pyramid, use the shape of its base.
→ The bases of a prism are ≅, //, and unique polygons.
→ The base of a pyramid is the polygon that all of the triangular faces touch.

Example:
1. Tell whether the figure is a polyhedron. Then name the solids.

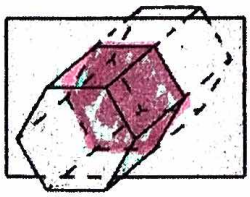
a. 
hexagonal prism

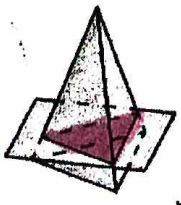
b. 
pentagonal pyramid.

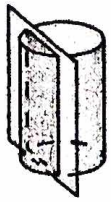
c. 
hemisphere

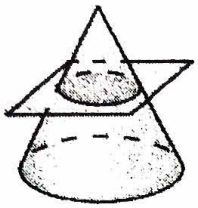
Cross Section: A cross section is that intersection of a plane and a solid.

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

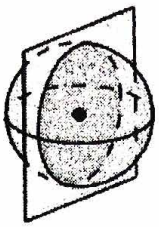
a. 
hexagon

b. 
triangle

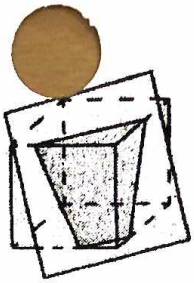
c. 
rectangle

d. 

on circle

e. 

circle

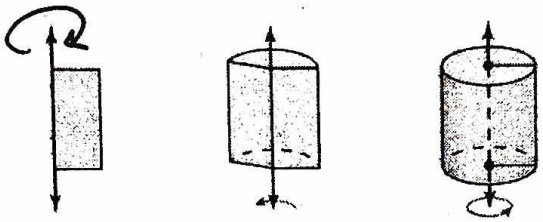
f. 

trapezoid

Solid of Revolution: a solid of revolution is a three-dimensional figure that is formed by rotating a two-dimensional shape around an axis.

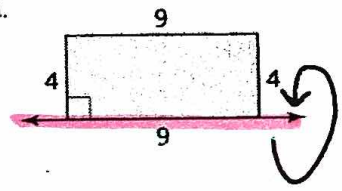
➔ The line that the shape is rotated around is called the axis of revolution.

For example, when you rotate a rectangle around a line that contains one of its sides, the solid of revolution that is produced is a cylinder.

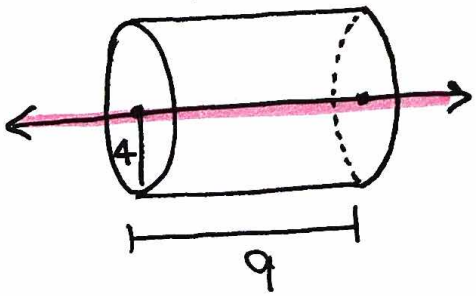


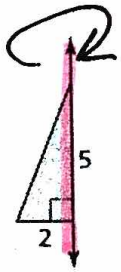
Example:

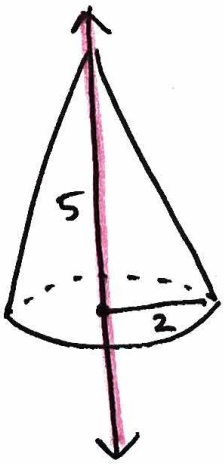
3. Sketch the solid produced by rotating the figure around the given axis. Then identify and describe the solid.

a. 

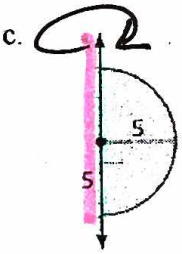
cylinder



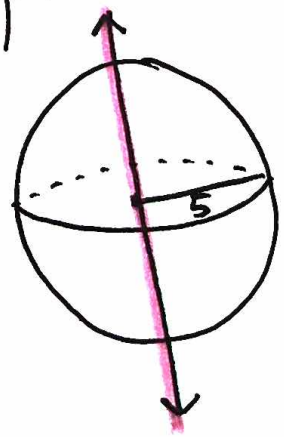
b. 



cone

c. 

sphere



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Volume and Surface Area of Solids (Prisms and Cylinders)

Lesson Objective IWBAT find volume of solids; find volume of similar solids.

The volume of a solid is the number of cubic units contained in its interior.

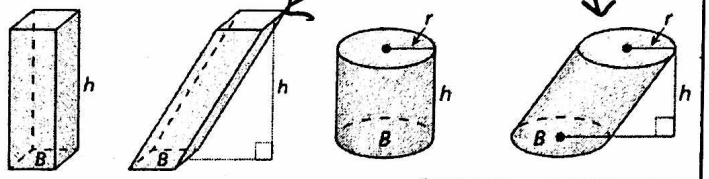
Volume is measured in cubic units, such as in^3 or cm^3

"oblique"

Volume of a Prism or Cylinder

The volume V is a prism is Bh.

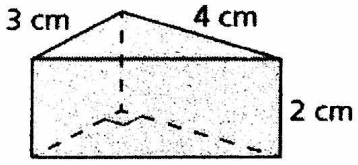
where B is the area of the base and h is the height.



*h is dist. btwn 2 bases (not always vertical!)

Examples:

1. Find the volume.

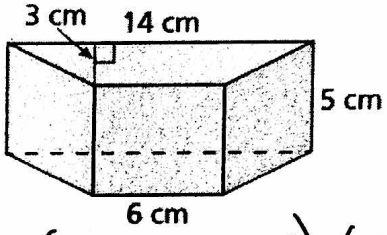


$V = Bh$

$= \left(\frac{1}{2}(4)(3)\right)(2)$

$= 12\ cm^3$

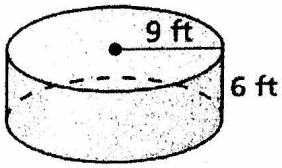
2. Find the volume.



$V = \left(\frac{1}{2}(6+14)(3)\right)(5)$

$= 150\ cm^3$

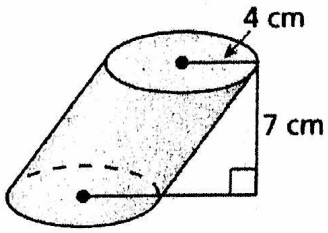
3. Find the volume.



$V = (\pi 9^2)(6)$

$= 486\pi\ ft^3$

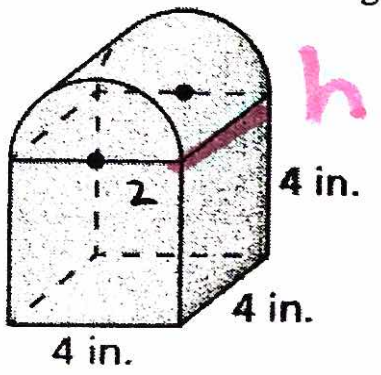
4. Find the volume.



$V = (\pi 4^2)(7)$

$= 112\pi\ cm^3$

6. Find the volume of the figure.

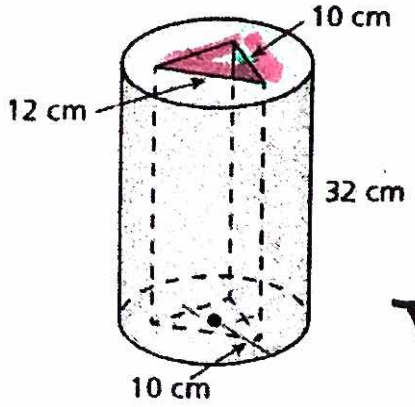


Cube + $\frac{1}{2}$ cyl

$(4 \cdot 4)(4) + \frac{\pi(2)^2 \cdot 4^2}{2}$

$64 + 8\pi$ $\approx 89.13 \text{ in}^3$

7. Find the volume of the figure.



cyl. − Δ prism

$\pi(10)^2(32) - \left(\frac{1}{2}(12)(8)\right)(32)$

$3200\pi - 1536$

$\approx 8517.10 \text{ cm}^3$