

NAME _____

SYLLABUS

Date _____ Period _____

GEOMETRY H

Unit 8 Syllabus: Surface Area & Volume

<u>Day</u>	<u>Topic</u>	
1	Space Figures and Cross Sections	
2	Surface Area and Volume of Spheres	
3	Surface Area of Prisms and Cylinders Surface Area of Pyramids and Cones	
4	Volumes of Prisms and Cylinders Volumes of Pyramids and Cones	
5	Review	
6	Quiz	
7	Areas and Volumes of Similar Solids	
8	Review	Review Sheets/Study
9	Test	To Be Determined

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Unit 8, Day 1: Space Figures & Cross Sections (S 11-1)

1. Use your book, your friends, and your brilliant teacher to define and fill in the following...

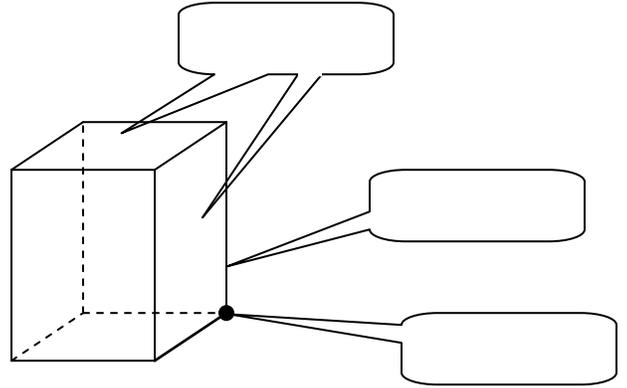
a) Polyhedron::

b) Face:

c) Edge:

d) Vertex:

e) Euler's Formula:



Warm up

Use Euler's Formula to find the missing number.

1) Faces: 5
Edges:
Vertices: 5

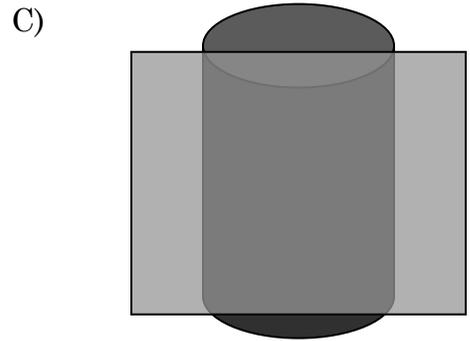
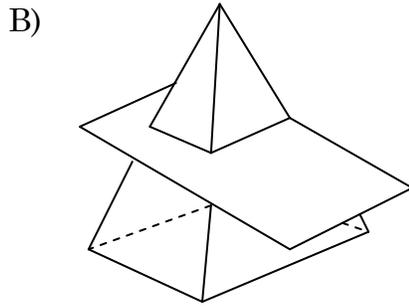
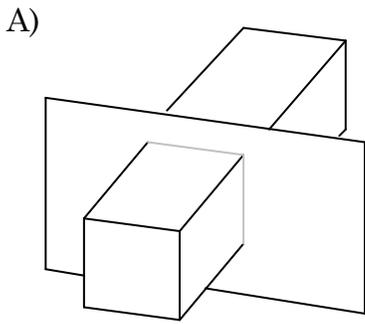
2) Faces:
Edges: 9
Vertices: 9

3) Faces: 8
Edges: 18
Vertices:

Using the demonstration given on a cross section, describe it below.

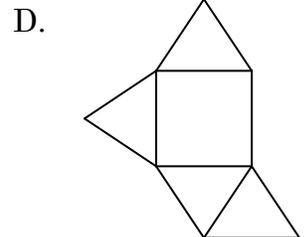
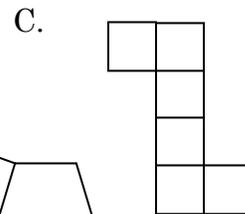
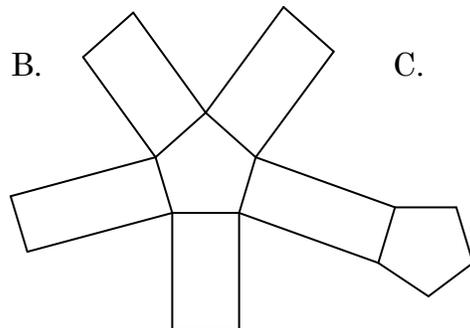
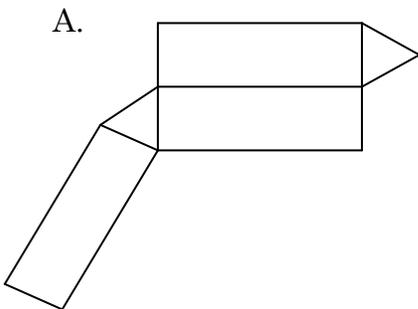
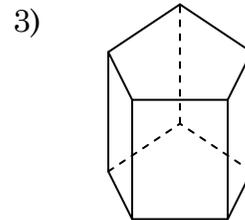
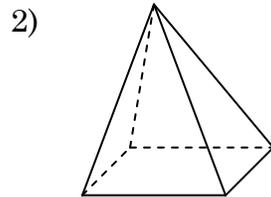
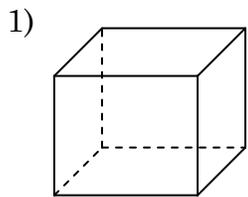
Formal Definition (cross section):

Determine the cross section of each figure below.

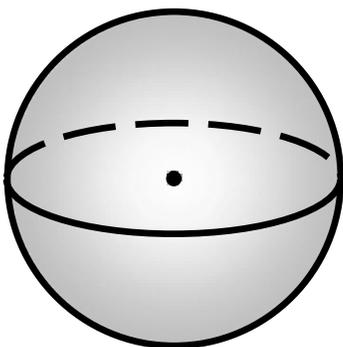
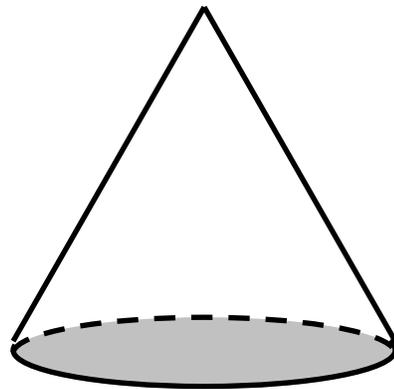
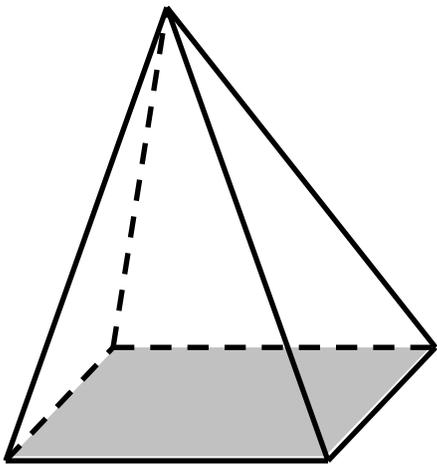
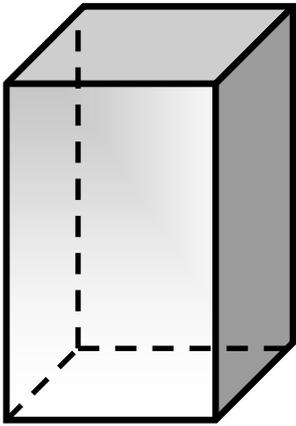


Using the demonstration given, describe what is meant by the *net* of a polyhedron.

Match each polyhedron with its net below.



Explanation of Figures: Prism, Cylinder, Pyramid, Cone, Sphere



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FORMULA SHEET!

GEOMETRY H

Formula Sheet – Volume and Surface Area (Unit 8)

Right Prism

$$V = Bh = \text{area of base} \times \text{height}$$



$$SA = 2B + Ph = 2 \times \text{area of base} + (\text{perimeter} \times \text{height})$$

Right Circular Cylinder

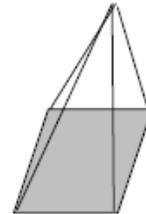
$$V = Bh = \text{area of base} \times \text{height} = \pi r^2 h$$



$$SA = 2B + Ch = 2 \times \text{base} + (\text{circumference} \times \text{height}) = 2\pi r^2 + 2\pi r h$$

Regular Pyramid

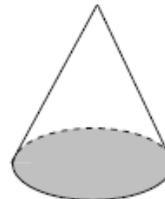
$$V = \frac{1}{3} Bh = \frac{1}{3} \times \text{area of base} \times \text{height}$$



$$SA = B + \frac{1}{2} Pl = \text{area of base} + \frac{1}{2} \times \text{perimeter of base} \times \text{slant height}$$

Right Circular Cone

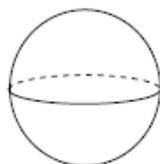
$$V = \frac{1}{3} Bh = \frac{1}{3} \times \text{area of base} \times \text{height} = \frac{1}{3} \pi r^2 h$$



$$SA = \pi r^2 + \pi r l$$

Sphere

$$V = \frac{4}{3} \pi r^3$$



$$SA = 4\pi r^2$$

L
E
G
E
N
D

B = area of base
P = perimeter of base
C = circumference of base
l = slant height of polyhedron
h = height of polyhedron

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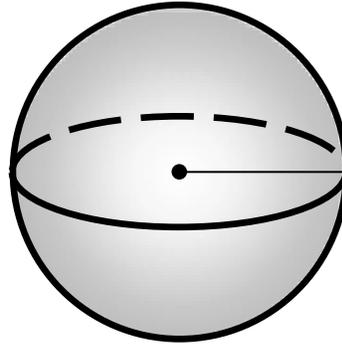
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CLASSWORK!

GEOMETRY H

U8D2 – Volume and Surface Area of Spheres

2. A sphere is a set of points in space equidistant from a point called the center.



Define the following:

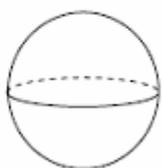
Radius: a segment that has one endpoint at the center and the other endpoint on the sphere

Diameter. A segment passing through the center with endpoints on the sphere

Great Circle: if the center of a circle is also the center of the sphere, then it's a great circle.

Hemisphere: a half sphere - a great circle divides a sphere into two hemispheres.

Sphere

$$V = \frac{4}{3}\pi r^3$$
$$SA = 4\pi r^2$$


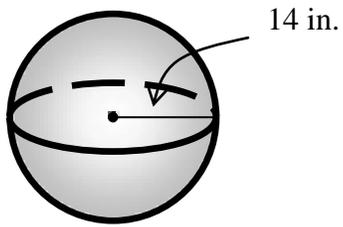
From your formula Sheet

Example: What is the volume and surface area of a sphere with radius 5?

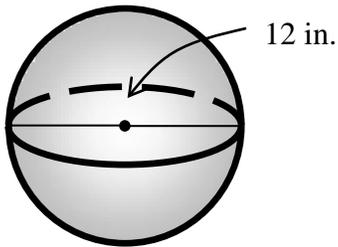
$$V = \frac{4}{3}\pi(5)^3 = \frac{4}{3}\pi(125) = \frac{500}{3}\pi$$

$$SA = 4\pi(5)^2 = 4\pi(25) = 100\pi$$

1. Find the volume and surface area.



2. Find the volume and surface area.



3. The volume of a sphere is 1200 ft^3 , what is the radius? What is the surface area?

4. The circumference of a basketball is approximately 75 cm, how much leather does it take to make the basketball?

5. An ice cream cone 6 inches tall, with a 2 inch radius is completely filled, including a perfect hemisphere sitting on top. How much ice cream is there?

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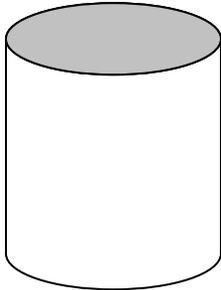
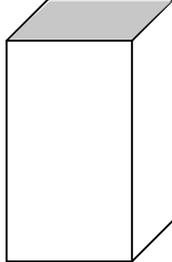
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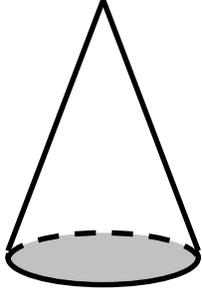
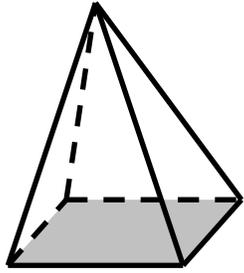
GEOMETRY H

U8D3: Surface Area – Prisms, Cylinders, Cones, Pyramids

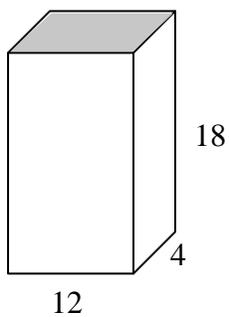
- Describe, compare, and contrast the words lateral area, base area, and surface area
 - Which figures have 2 bases and which figures have only 1 base?
 - What does the letter ℓ represent on your formula sheet? Name the word & describe it.
-
- The Cylinder and Prism are the same... except the base is a circle instead of a polygon.

		
Area of Base	Circle = πr^2	Triangle = $\frac{1}{2}b \cdot h$ Rectangle = $b \cdot h$ Polygon = $\frac{1}{2}a \cdot p$
Length around the base	Circumference = $2\pi r$	Perimeter = add up all sides
Lateral Area	LA = $Ch = 2\pi rh$	LA = $Ph = \text{Perimeter} \cdot \text{height}$
Surface Area	SA = LA + 2B = $2\pi rh + 2\pi r^2$	SA = $Ph + 2B$

5. The pyramid and the cone are the same, except the base is a circle instead of a polygon.

		
Area of Base	Circle = πr^2	Triangle = $\frac{1}{2}b \cdot h$ Rectangle = $b \cdot h$ Polygon = $\frac{1}{2}a \cdot p$
Length around the base	Circumference = $2\pi r$	Perimeter = add up all sides
Lateral Area	$LA = \frac{1}{2}2\pi r l = \pi r l$	$LA = \frac{1}{2}Pl = \text{Perimeter} \cdot \text{slant-height}$
Surface Area	$SA = LA + B = \pi r l + \pi r^2$	$SA = B + \frac{1}{2}Pl$

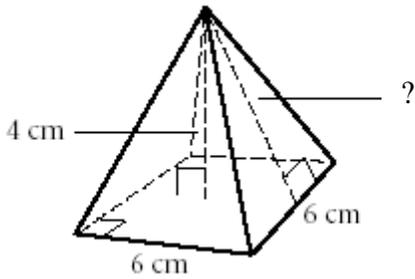
1. Right Rectangular Prism



$B = \underline{\hspace{2cm}}$, $h = \underline{\hspace{2cm}}$, $P = \underline{\hspace{2cm}}$

$LA = \underline{\hspace{2cm}}$, $SA = \underline{\hspace{2cm}}$

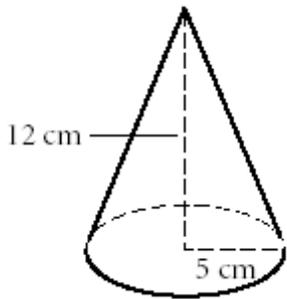
2. Right Square Pyramid



$B = \underline{\hspace{2cm}}, h = \underline{\hspace{2cm}}, P = \underline{\hspace{2cm}}, l = \underline{\hspace{2cm}}$

$LA = \underline{\hspace{2cm}}, SA = \underline{\hspace{2cm}}$

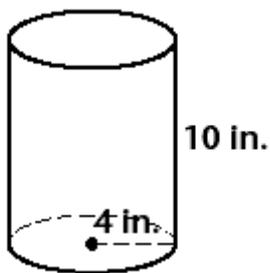
3. Right Cone



$B = \underline{\hspace{2cm}}, h = \underline{\hspace{2cm}}, C = \underline{\hspace{2cm}}, l = \underline{\hspace{2cm}}$

$LA = \underline{\hspace{2cm}}, SA = \underline{\hspace{2cm}}$

4. Right Cylinder



$B = \underline{\hspace{2cm}}, h = \underline{\hspace{2cm}}, C = \underline{\hspace{2cm}}$

$LA = \underline{\hspace{2cm}}, SA = \underline{\hspace{2cm}}$

What are the formulas for the surface area of a prism, cylinder, pyramid and cone? Compare and contrast them

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GEOMETRY H

U8D4: Volumes – Prisms, Cylinders, Cones, Pyramids

Notes presented on powerpoint. All formulas are listed on your formula sheet

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REVIEW!

GEOMETRY H

U8D5: Review for Day 6 Quiz

Racecar game continued. You may make a note card for tomorrow's quiz!

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GEOMETRY H

Unit 8, Day 7: Areas/Volumes of Similar Solids (S 11-7)

Warm Up

1. In the space below, describe and draw a pair of similar polygons

Describe and draw similar solids

2. Describe a one-dimensional measurement
3. Describe a two-dimensional measurement
4. Describe a three-dimensional measurement
5. Fill in the chart below by naming each variable from your formulas sheet, and determining what dimension it is.

Variable	Name	Dimension
V		
B		
h		
P		
SA		
C		
l		
r		

6. Reminder: The _____ of two similar figures gives the ratio of the corresponding linear (1) dimensions of the figures.

7. Refer to the chart from the warm up to determine what dimension each variable is...

If the similarity ratio of two similar solids is given $a:b$, then...

(1) the ratio of their corresponding (surface) areas (2 dimensions) is

(2) the ratio of their volumes (3 dimensions) is

8. Example: Two similar cones have radii in the ratio of 4:5.

a) What is the ratio of their heights?

b) What is the ratio of their surface areas?

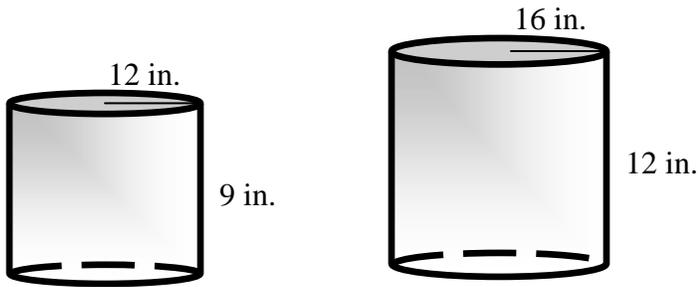
c) What is the ratio of their volumes?

d) The smaller cone has a volume of 42π . What is the volume of the larger cone?

Set up a RATIO!

9. The ratio of the surface areas of two similar prisms is 9:16. What is the ratio of their volumes?

10. Are the following polygons similar?



11. Pyramid 1: $SA = 25 \text{ cm}^2$, $V = \underline{\hspace{2cm}}$

Pyramid 2: $SA = 36 \text{ cm}^2$, $V = 216 \text{ cm}^3$

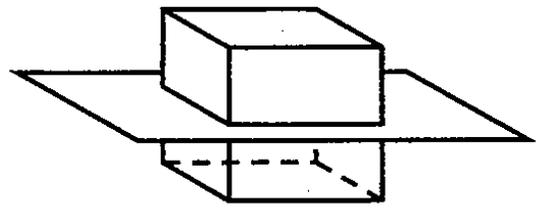
12. The ratio of the volumes of two similar solids is 125:27. What is the ratio of their surface areas? What is the ratio of their heights?

13. The volumes of two similar cylinders is 125π and 64π . What is their similar ratio?

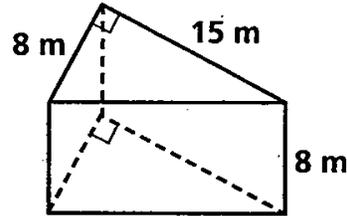
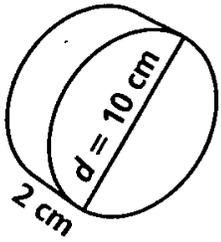
14. Closure: Describe the connection between the similarity ratio, the ratio of areas and the ratio of volumes for two similar solids.

4. **Cone:** A cone has a radius of $\sqrt{3}$ and a volume of 12π . What is the slant height of the cone?
5. **Spheres:** A sphere has a volume of 36π . What is the surface area of the sphere?
6. **Similar Solids:** The similarity ratio of two cones is 4:5. What is the ratio of their surface areas? What is the ratio of their volumes? If the surface area of the smaller cone is 64, what is the surface area of the larger cone?

7. Describe the cross section of the figure shown.



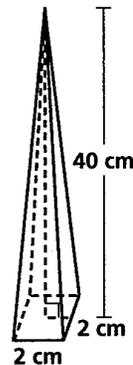
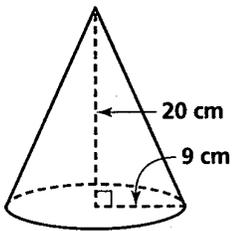
8. Find the Lateral Area, Surface Area, and Volume of the figures shown below.



LA = _____, SA = _____, V = _____

LA = _____, SA = _____, V = _____

9. Find the Lateral Area, Surface Area, and Volume of the figures shown below.



LA = _____, SA = _____, V = _____

LA = _____, SA = _____, V = _____

10. Find the volume of a right pyramid with a regular hexagonal base (sides lengths 6) and a height of 9.

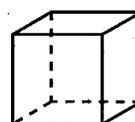
11. The pairs of figures shown below are similar, find the similarity ratio.



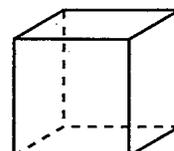
$$\text{S.A.} = 49 \text{ cm}^2$$



$$\text{S.A.} = 81 \text{ cm}^2$$



$$V = 125 \text{ in.}^3$$



$$V = 512 \text{ in.}^3$$

12. **The surface areas of two similar figures are given. The volume of the larger figure is given. Find the volume of the smaller figure.**

a) $\text{S.A.} = 25 \text{ cm}^2$
 $\text{S.A.} = 36 \text{ cm}^2$
 $V = 216 \text{ cm}^3$

b) $\text{S.A.} = 72 \text{ ft}^2$
 $\text{S.A.} = 98 \text{ ft}^2$
 $V = 686 \text{ ft}^3$

13. A cone and a cylinder have the same radius and the same volume. If the height of the cone is 18 inches, what is the height of the cylinder?