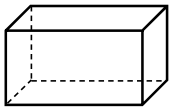
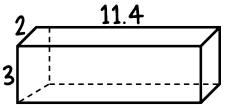
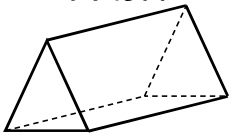
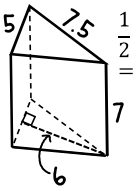
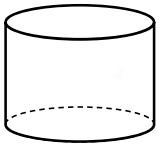
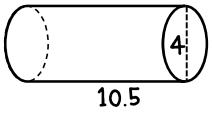
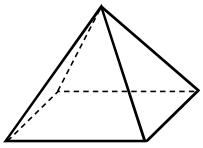
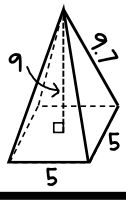
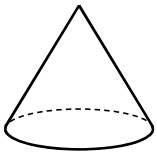
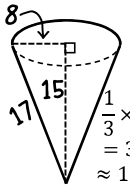
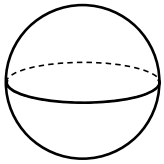
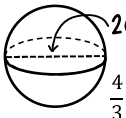
GEOMETRY

UNIT 9 AGENDA - Volume

subject to change

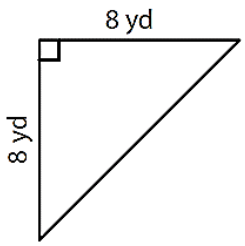
DATE	DAY	LESSON	PAGE	HOMEWORK
3/13 Mon	9.1	Volume of Prisms & Cylinders	2 – 7	DeltaMath 9.1 Due WEDNESDAY 3/15
3/14 Tues	9.2	Volume of Pyramids & Cones	8 – 11	DM 9.1 due tomorrow
3/15 Wed	9.3	Practice & **Mini Quiz**		
3/16 Thurs	9.4	Volumes of Spheres & Composite Figures	12 – 15	DeltaMath 9.2 Due TUESDAY 3/21
3/17 Fri	9.5	Cross Sections	16 – 20	
3/20 Mon	9.6	Review	21 – 23	DM 9.2 due tomorrow
3/21 Tues	9.7	**TEST TODAY!!! GOOD LUCK!!!**		

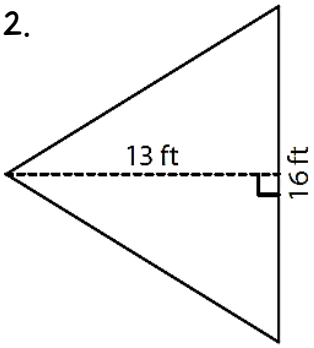
VOLUME REFERENCE SHEET

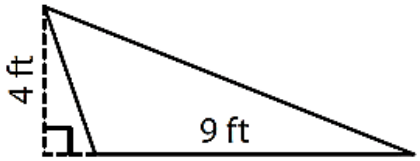
RECTANGULAR PRISM 	Shape of **B**ase: Rectangle Area Formula for **B**ase: $A = lw$	Volume Formula: $V = Bh$ V = area of Base x height	Example:  $2 \times 11.4 \times 3$ $= 68.4\ units^3$
TRIANGULAR PRISM 	Shape of **B**ase: Triangle Area Formula for **B**ase: $A = \frac{1}{2}bh$	Volume Formula: $V = Bh$ V = area of Base x height	Example:  $\frac{1}{2} \times 5 \times 6 \times 7$ $= 105\ units^3$
CYLINDER 	Shape of **B**ase: Circle Area Formula for **B**ase: $A = \pi r^2$	Volume Formula: $V = Bh$ V = area of Base x height	Example:  $\pi \times 2^2 \times 10.5$ $= 42\pi\ (\approx 131.95)\ units^3$
PYRAMID 	Shape of **B**ase: Rectangle (or other polygons) Area Formula for **B**ase: $A = lw$ (or others)	Volume Formula: $V = \frac{1}{3}Bh$ V = 1/3 x area of Base x height	Example:  $\frac{1}{3} \times 5 \times 5 \times 9$ $= 75\ units^3$
CONE 	Shape of **B**ase: Circle Area Formula for **B**ase: $A = \pi r^2$	Volume Formula: $V = \frac{1}{3}Bh$ V = 1/3 x area of Base x height	Example:  $\frac{1}{3} \times \pi \times 8^2 \times 15$ $= 320\pi\ units^3$ $\approx 1005.31\ units^3$
SPHERE 	No Base	Volume Formula: $V = \frac{4}{3}\pi r^3$ V = 4/3 x π x (radius cubed)	Example:  $\frac{4}{3} \times \pi \times 10^3$ $= 1333\frac{1}{3}\pi\ units^3$ $\approx 4188.79\ units^3$

WARM-UP **NAME:** _____

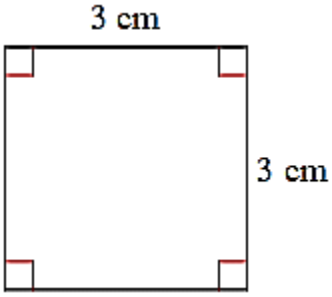
Find the area of the triangles. $A = \frac{1}{2}bh$

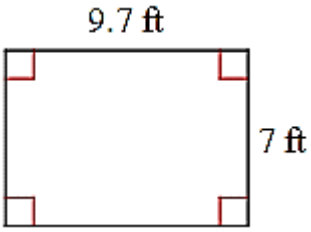
1. 

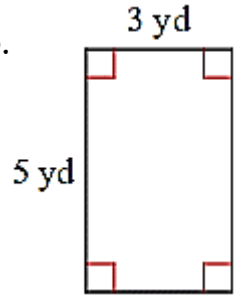
2. 

3. 

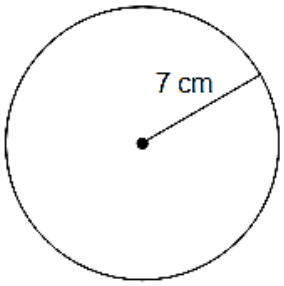
Find the area of the rectangles and squares. Rectangle: $A = bh$ Square: $A = s^2$

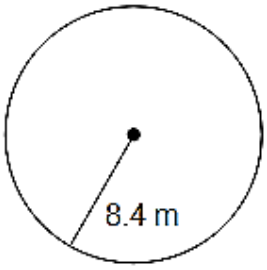
4. 

5. 

6. 

Find the area of the circles. Round to the nearest tenth. $A = \pi r^2$

7. 

8. 

9. 

Geometry
Volume of Prisms & Cylinders

Name: _____
Date: _____

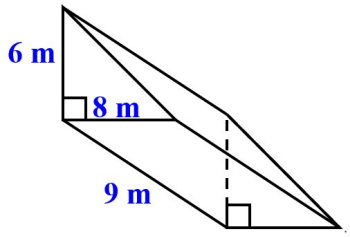
Volume of Prisms & Cylinders

$V = B \cdot h$

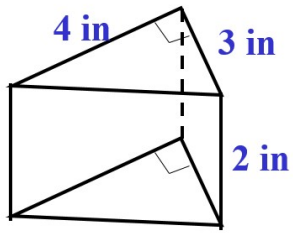
- _____
- _____
- _____

Formulas to Remember:
Area of Rectangle: $A = l \cdot w$
Area of Triangle: $A = \frac{1}{2}bh$
Area of Circle: $A = \pi r^2$

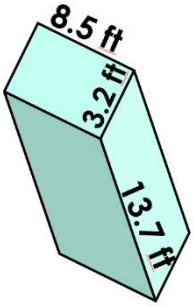
1. V = _____



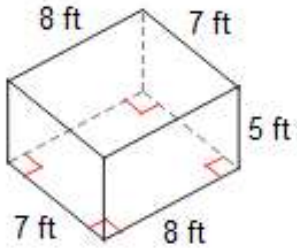
2. V = _____



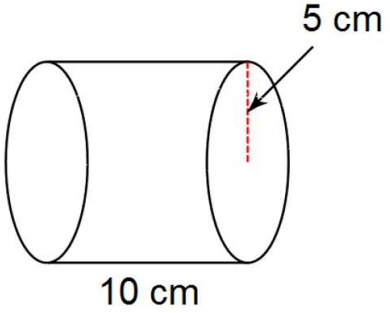
3. V = _____



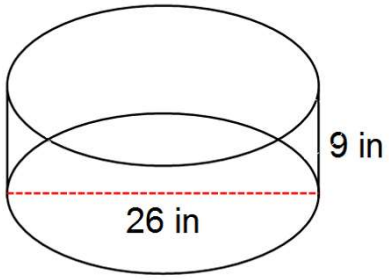
4. V = _____



5. V = _____



6. V = _____



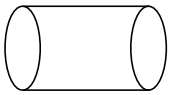
Geometry Name_____

Classwork - Prisms & Cylinders

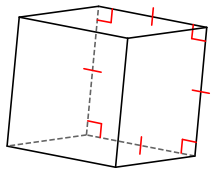
Date_____ Period____

Name each figure.

1)

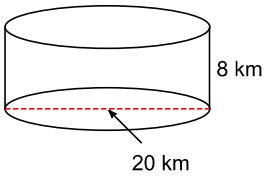


2)

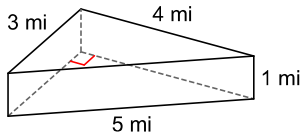


Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

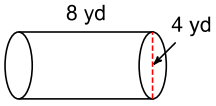
3)



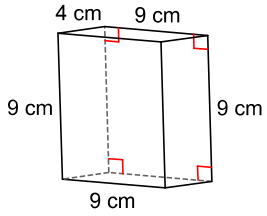
4)



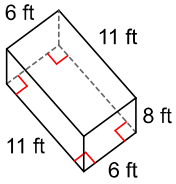
5)



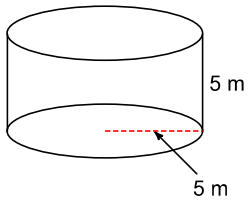
6)



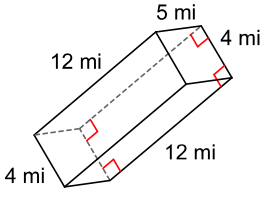
7)



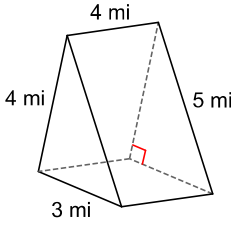
8)



9)



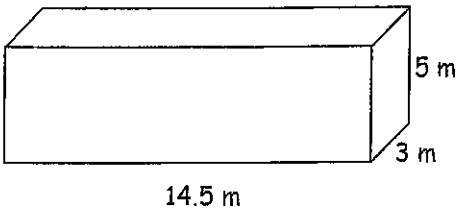
10)



Name: _____ Units: _____

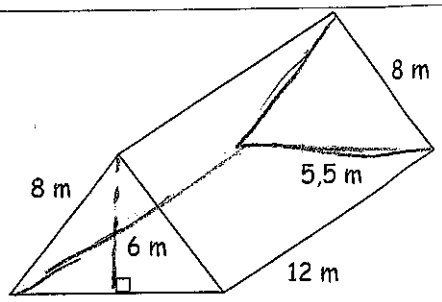
Volume of Prisms and Cylinders Worksheet

1.)



Area of Base: **Volume:**

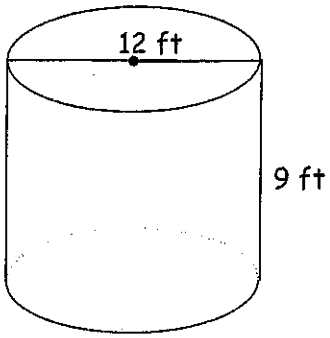
2.)



Area of Base: **Volume:**

3.)

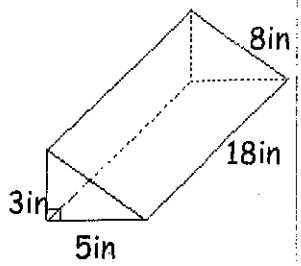
Area of Base:



Volume:

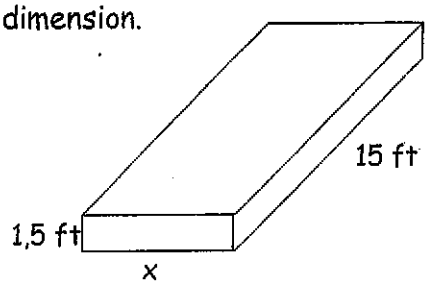
4.)

Area of Base:

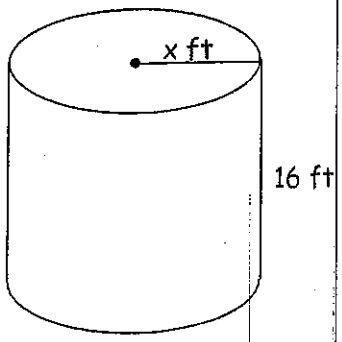


Volume:

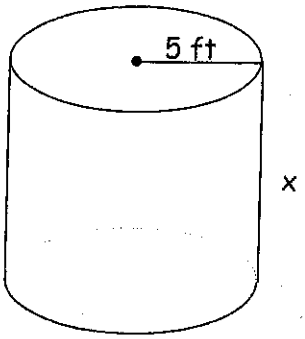
5.) If the volume of the figure below is $135ft^3$, find the missing dimension.



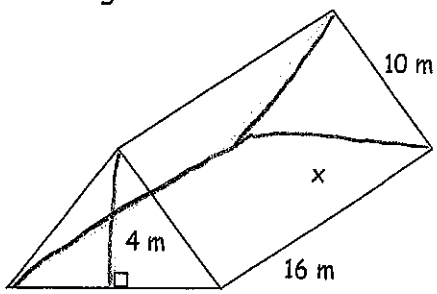
6.) If the volume of the figure below is $4{,}069.44\ ft^3$, find the missing dimension.



7.) If the volume of the figure below is $902.75ft^3$, find the missing dimension.



8.) If the volume of the figure below is $224m^3$, find the missing dimension.



9.) Cameron makes a glass cylinder that has a diameter of 6 in. and a height of 5 in. for a friend. He wants to send it to his friend in a box that is 6 x 6 x 5. He wants to put the cylinder in a box and wrap it with packing foam. How much packing foam does Cameron need?

10.) The radius of a cylinder is 3 m and the height is 4 m.

a.) What is the volume of the cylinder?

b.) If you double the radius, what is the new volume?

c.) How do these two volumes compare? Why do you think this happens?

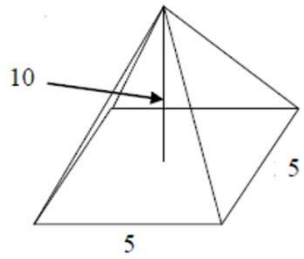
Name: _____

Date: _____

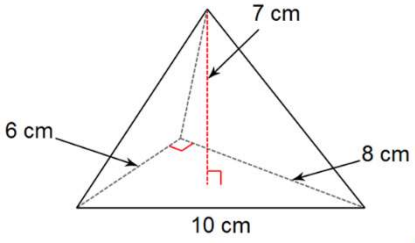
Volume of Pyramids and Cones

$$V = \frac{1}{3} B \cdot h$$

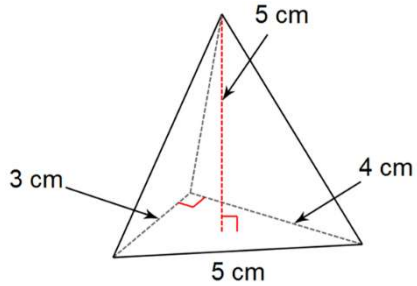
7. V = _____



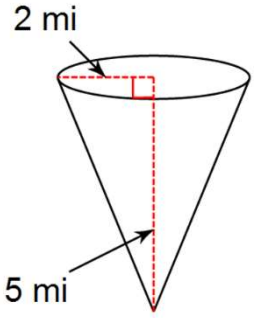
8. V = _____



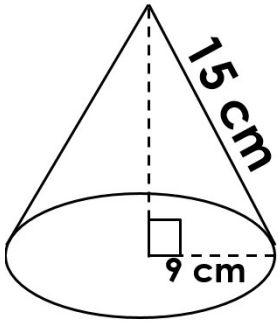
9. V = _____



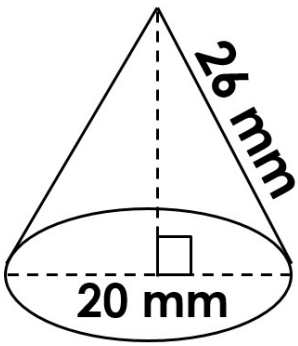
10. V = _____



11. V = _____



12. V = _____

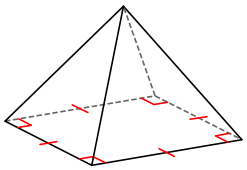


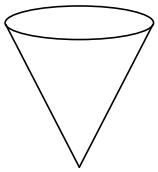
Geometry Name_____

Classwork - Pyramids & Cones

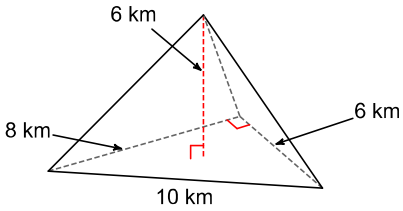
Date_____ Period____

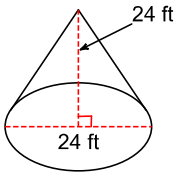
Name each figure.

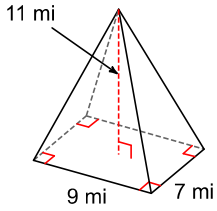
1) 

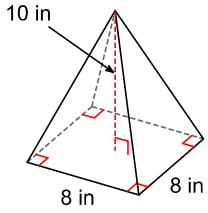
2) 

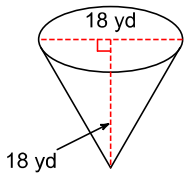
Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

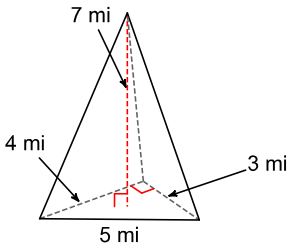
3) 

4) 

5) 

6) 

7) 

8) 

9) A rectangluar pyramid of height 10 ft measuring 10 ft and 12 ft along the base.

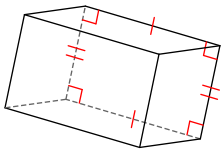
10) A cone with radius 5 ft and a height of 10 ft.

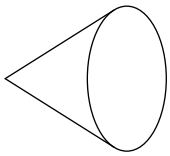
Geometry Name_____

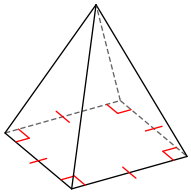
Classwork - Mixed Practice

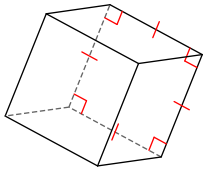
Date_____ Period____

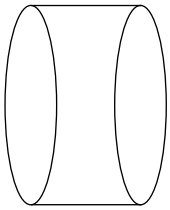
Name each figure.

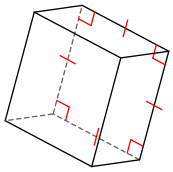
1) 

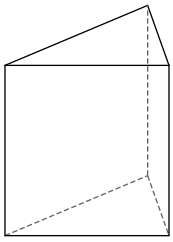
2) 

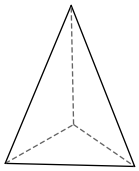
3) 

4) 

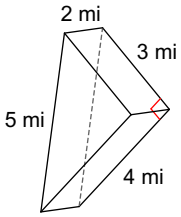
5) 

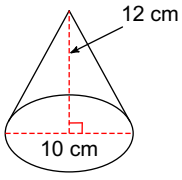
6) 

7) 

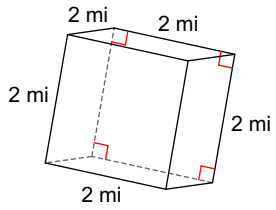
8) 

Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

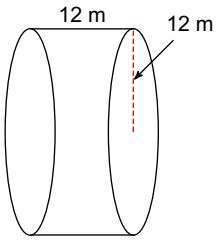
9) 

10) 

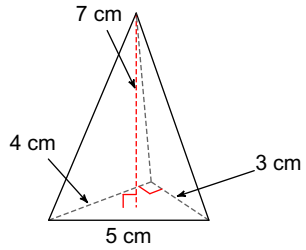
11)



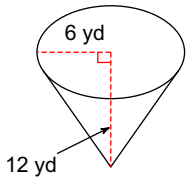
12)



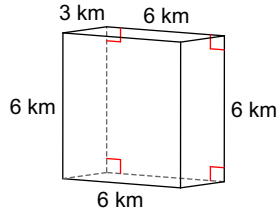
13)



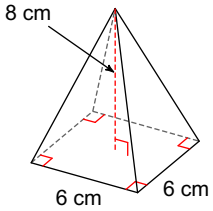
14)



15)



16)



17) A prism 5 cm tall with a right triangle for a base with side lengths 3 cm, 4 cm, and 5 cm.

18) A rectangluar pyramid of height 6 ft measuring 5 ft and 6 ft along the base.

19) A cone with radius 1 km and a height of 6 km.

20) A square prism measuring 7 yd along each edge of the base and 6 yd tall.

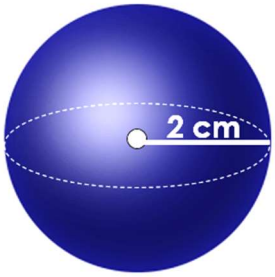
Geometry **Name:** _____
Volume of Spheres **Date:** _____

Volume of Spheres

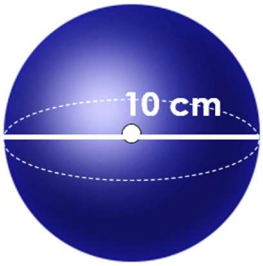
$$V = \frac{4}{3}\pi r^3$$

- If you cut a sphere right down the middle you would create two congruent halves called _____.
- A _____ is the cross section that is formed when you cut a sphere in half.

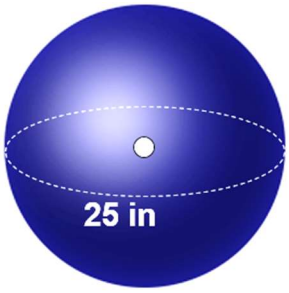
13. V = _____



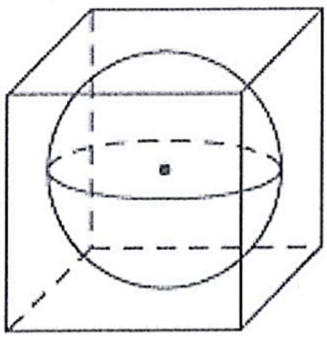
14. V = _____



15. The circumference of a great circle is 25 inches. Find the volume. V = _____

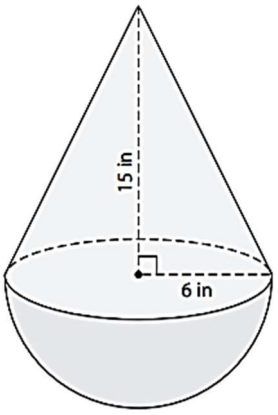


16. A sphere is inscribed in a cube-shaped box as pictured below. To the nearest centimeter, what is the volume of the empty space in the box?

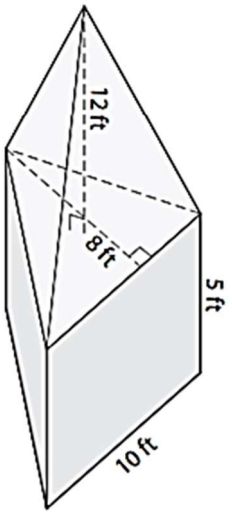


Volume of Composite Figures

1.



2.



V_{cone} = _____

$V_{hemisphere}$ = _____

V_{total} = _____

V_{prism} = _____

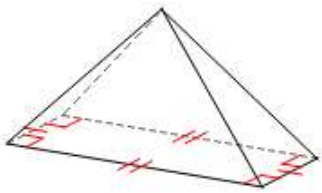
$V_{pyramid}$ = _____

V_{total} = _____

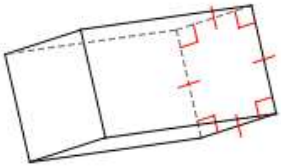
PUTTING IT ALL TOGETHER

Name each figure.

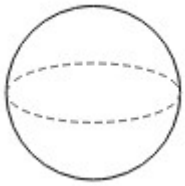
1.



2.

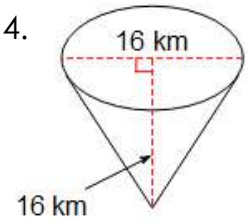


3.

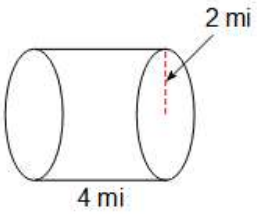


Find the volume of each figure. Round your answer to the nearest tenth, if necessary.

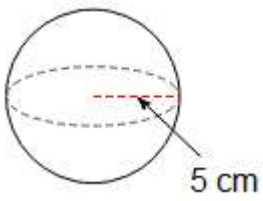
4.



5.



6.



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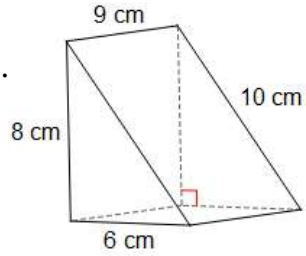
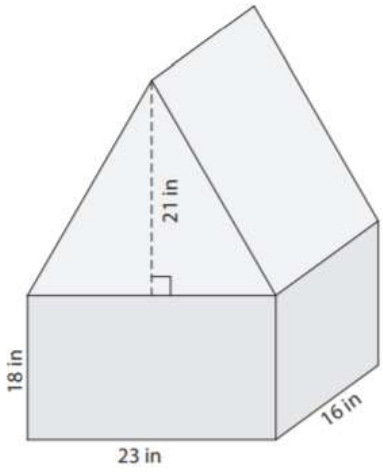


8.

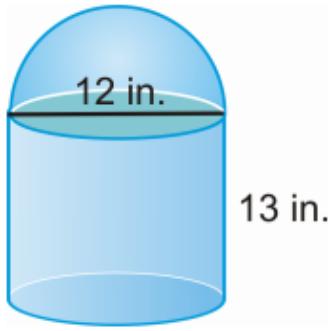


Geometry **Name:** _____
Volume of Prisms & Cylinders **Date:** _____

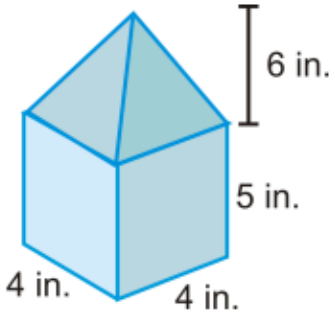
Classwork: Volume of Composite Solids

Find the volume of each of the following composite functions.

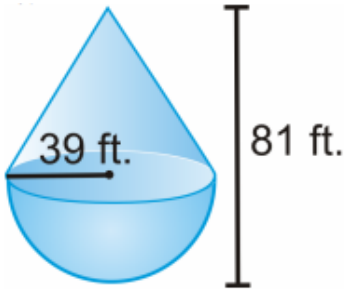
1.



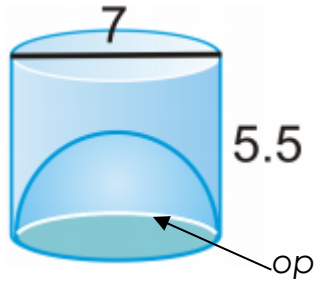
2.



3.



4.



Tennis balls with a 3 inch diameter are sold in cans of three. The can is a cylinder.

5. What is the volume of one tennis ball?

6. What is the volume of the cylinder?

7. How much space is not occupied by the tennis balls in the can?

One hot day at a fair you buy yourself a snow cone. The height of the cone shaped container is 5 in and its radius is 2 in. The shaved ice is perfectly rounded on top forming a hemisphere.

8. What is the volume of the ice in your frozen treat?

The volume of one ball is 288π $in.^3$

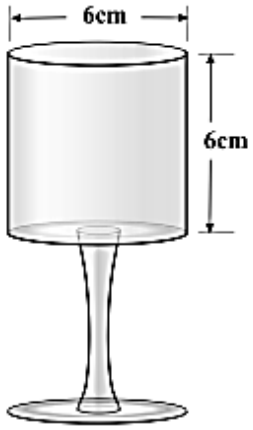
9. What is the radius of the ball?

10. If 4 of the balls were stacked on top of each other, how tall would the stack be?

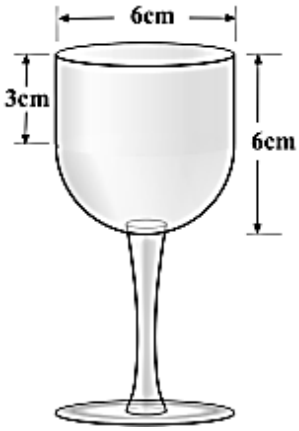
Geometry Name: _____
Cross Sections & Cavalieri's Principle Date: _____

WARM-UP: Find the volume of each glass. Which of the following holds the most liquid?

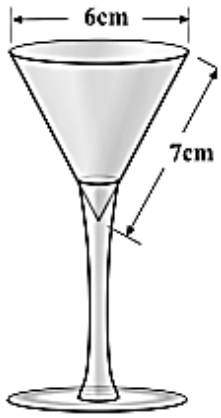
Glass 1



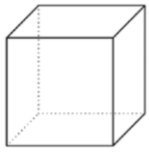
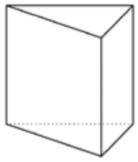
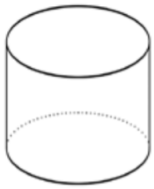
Glass 2

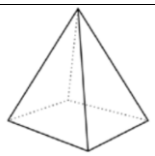
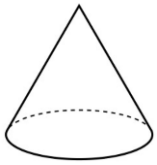
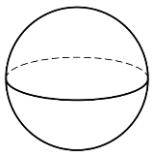


Glass 3



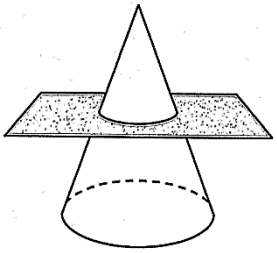
CROSS SECTIONS – The shape you get when cutting straight through a 3-dimensional shape.

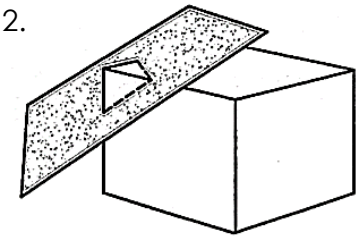
	NAME	**SHAPE OF BASE**	**Which figure results when you slice it PARALLEL to the base?**	**Which figure results with you slice it PERPENDICULAR to the base?**	**Which figure results when you slice it DIAGONAL to the base?**
					
					
					

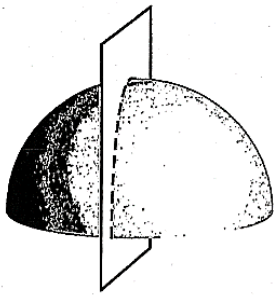
	NAME	SHAPE OF BASE	Which figure results when you slice it PARALLEL to the base?	Which figure results with you slice it PERPENDICULAR to the base?	Which figure results when you slice it DIAGONAL to the base?
					
					
					
					

PRACTICE

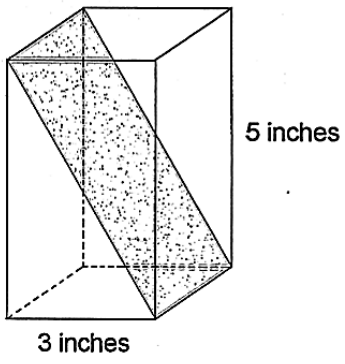
What are the shapes of the cross sections below?

1. 

2. 

3. 

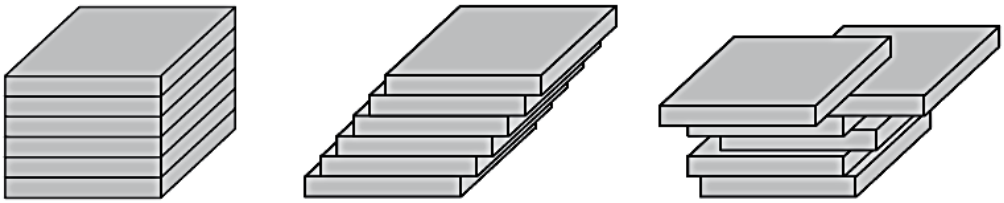
4. Andrew had a piece of foam in the shape of a rectangular prism as shown below. The base is a square with sides 3 inches long, and the piece is 5 inches tall. He cut the foam along the diagonal plane shown by the shaded area. What is the area of the shaded diagonal plane?



Bonaventura Cavalieri – He was an Italian mathematician born in 1598 – 1657. He is known for his work in optics, motion, calculus, and introduction of logarithms.

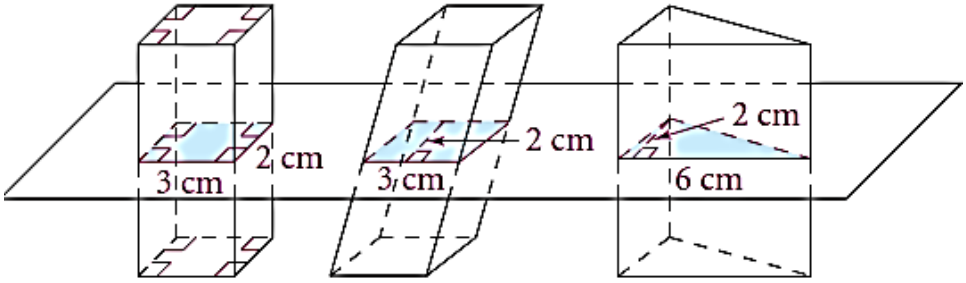
CAVALIERI'S PRINCIPLE

- The volumes of two objects of the same height are equal if the areas of their corresponding cross sections are equal.



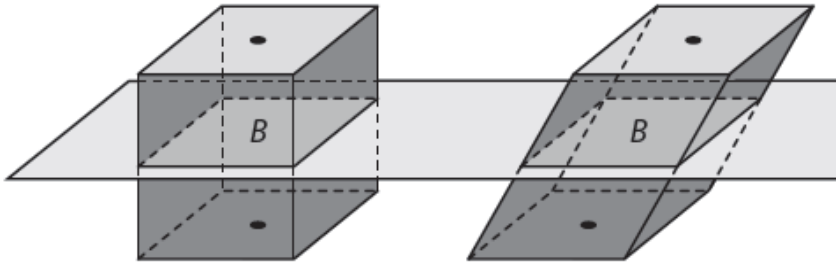
These pieces maintain the **SAME** volume regardless of how they are moved!!

Find the area of each cross section below.



Based on what we know about the areas of the cross sections, what can we assume about the volumes (assuming all three heights are the same)?

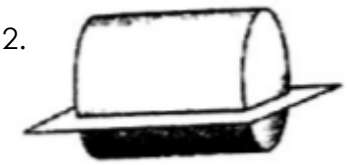
The same volume formula applies whether it's a **right** prism or an **oblique** prism.



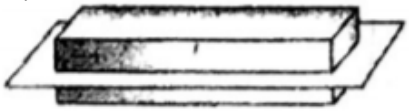
PRACTICE:

Name the cross section.

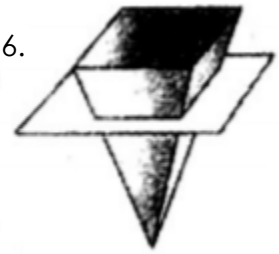
1. 

2. 

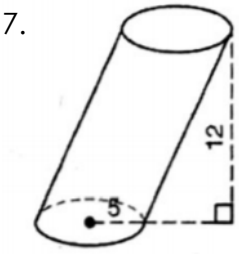
3. 

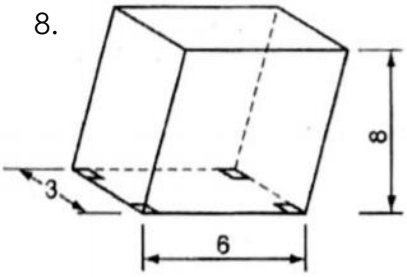
4. 

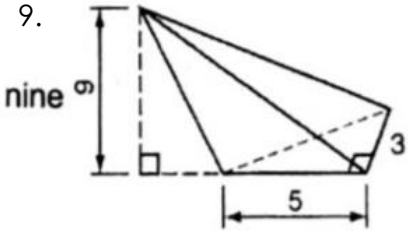
5. 

6. 

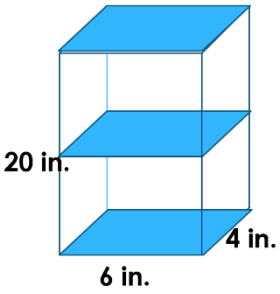
Find the volume of each oblique figure.

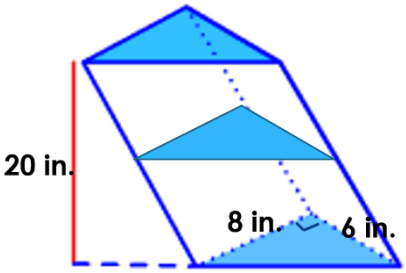
7. 

8. 

9. 

10. Which figure has more volume?



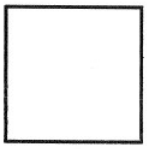


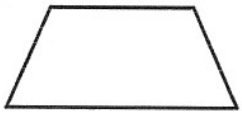
11. Collin is going to change the oil in his Jeep. He has two funnels. A has a diameter of 6 inches and is 5 inches deep. B has a diameter of 5 inches but is 7 inches deep. He wants to use the funnel with the greatest volume to minimize the chance of spilling the oil. What are the volumes of the funnels? Which one should he use A or B?

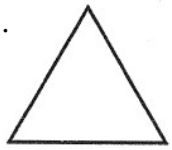
Geometry Name: _____

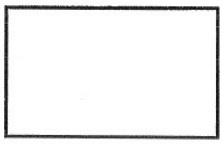
Classwork – Cross Sections & Cavalieri's Principle Date: _____

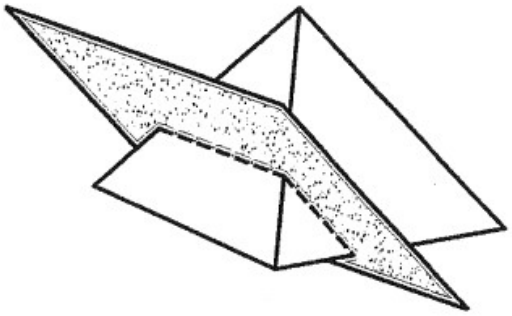
1. A square pyramid is cut along the shaded plane shown below. Which of the following is the cross-section of this solid?

A. 

B. 

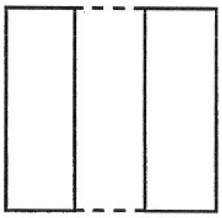
C. 

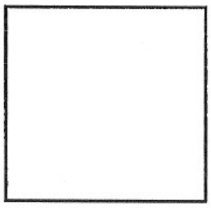
D. 

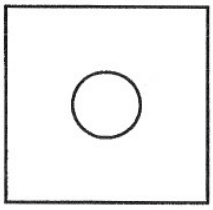


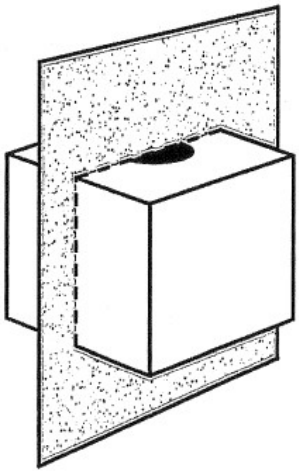
2. A cube with a cylinder cut from its center is cut along the plane shown below. Which of the following is the cross-section of this solid?

A. 

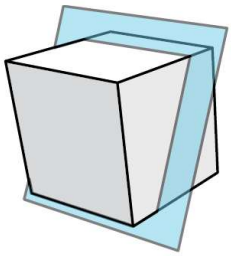
B. 

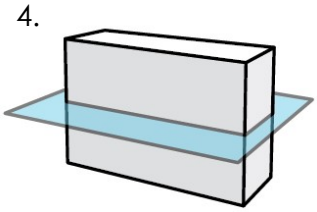
C. 

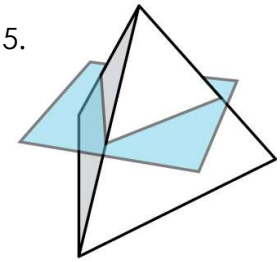
D. 

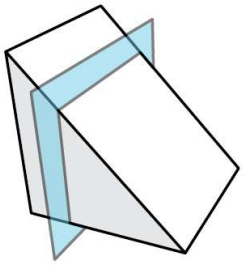


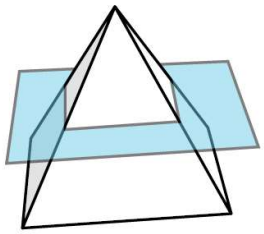
Determine the 2D shape created if the 3D shape were sliced as shown.

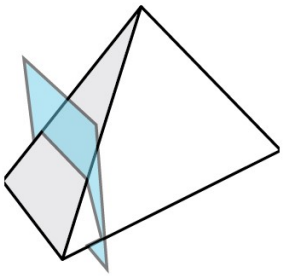
3. 

4. 

5. 

6. 

7. 

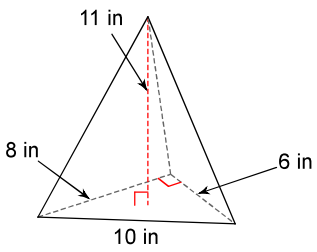
8. 

Assignment: Test Review

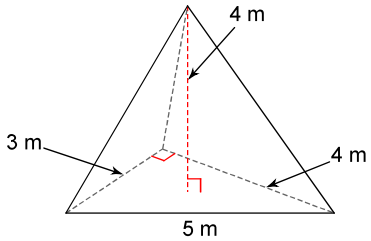
Date_____ Period____

Find the volume of each figure. Round your answers to the nearest tenth, if necessary.

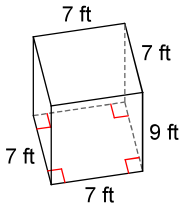
1)



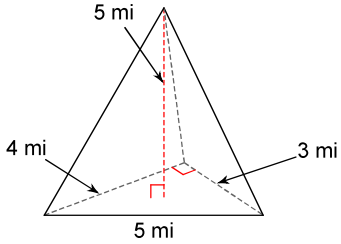
2)



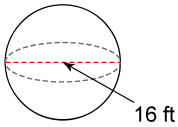
3)



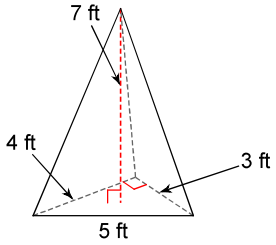
4)



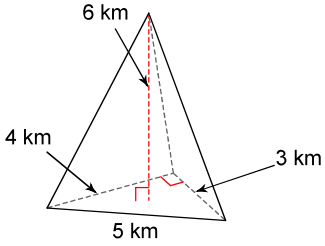
5)



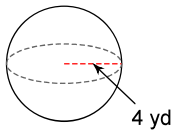
6)



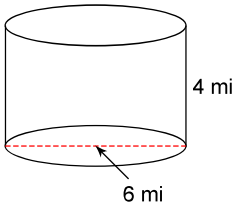
7)



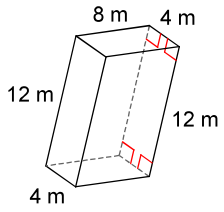
8)



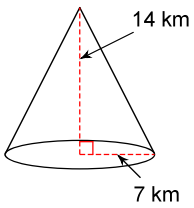
9)



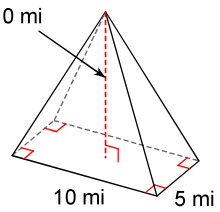
10)



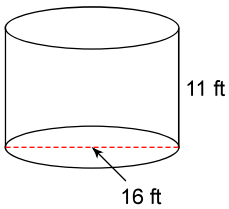
11)



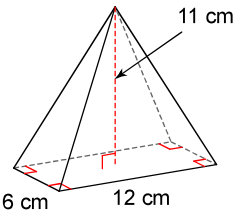
12)



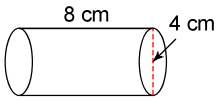
13)



14)



15)



Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

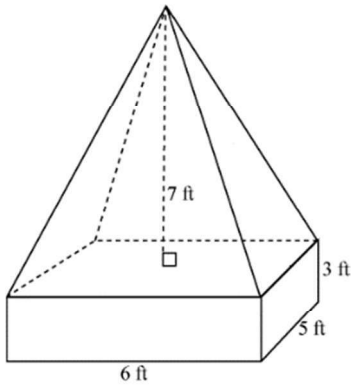
16) A sphere with a diameter of 22 mi.

17) A prism 3 km tall with a right triangle for a base with side lengths 3 km, 4 km, and 5 km.

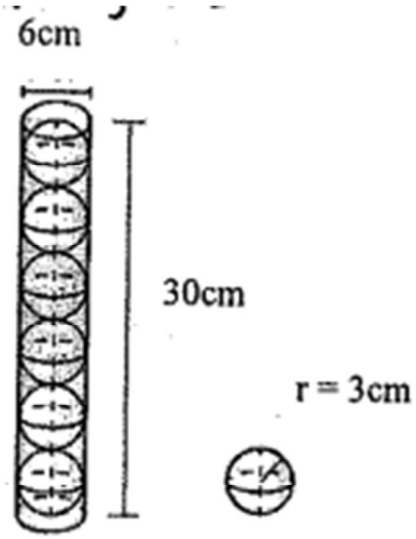
18) A cone with diameter 20 yd and a height of 20 yd.

19) A cylinder with a radius of 12 cm and a height of 11 cm.

20. Find the total volume of the figure below.

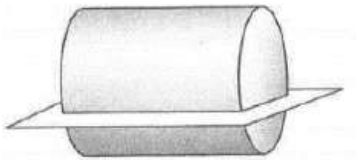


21. A cylindrical container of six rubber balls has a height of 30 centimeters and a diameter of 6 centimeters. Each ball in the container has a radius of 3 centimeters. Find the amount of space in the container that is not occupied by rubber balls. Round your answer to the nearest whole number. Hint: find the total volume of the cylinder and subtract the volume of the 6 rubber balls.



22. Name the cross section

a.



b.