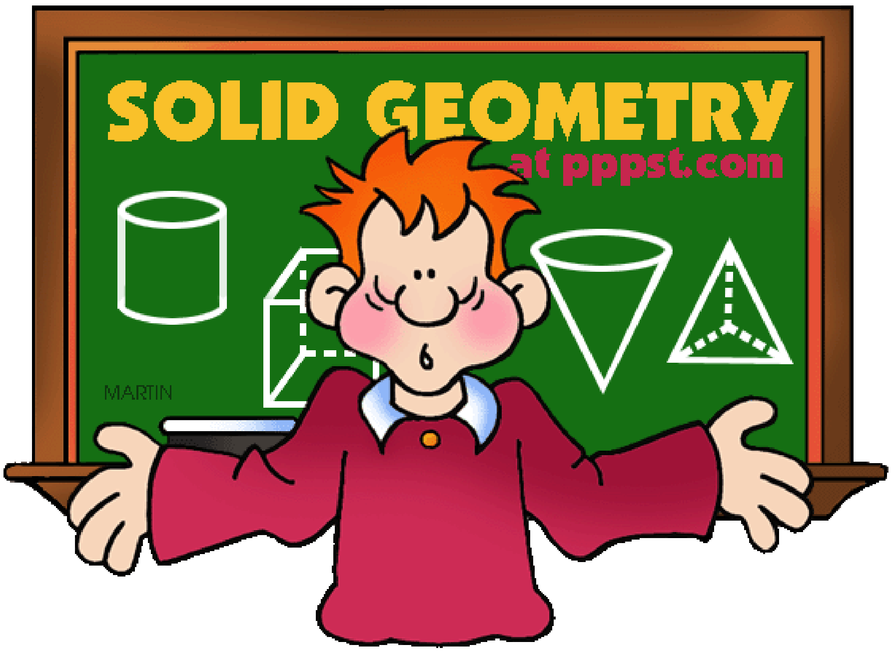
Name:____ Date: ____________
Geometry Honors 2013-2014

Solid Geometry



Name:______________________________

Teacher:____________________________

Pd: _______

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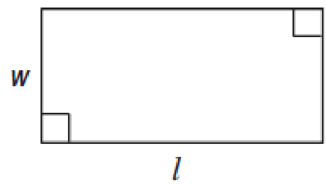
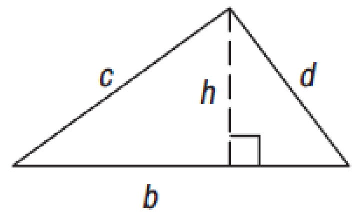
Basic Area Formulas

Rectangle



$P = 2l + 2w$
$A = lw$

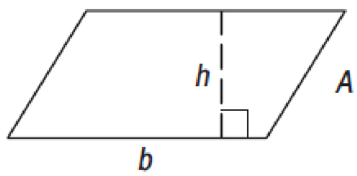
Triangle



$P = b + c + d$

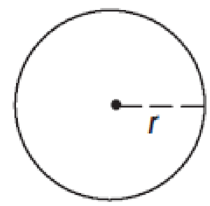
$A = \frac{1}{2}bh$

Parallelogram



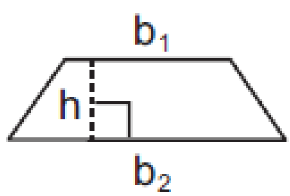
$A = bh$

Circle



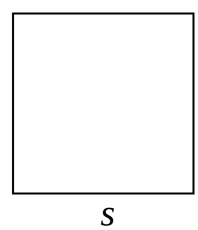
$C = 2\pi r$
$A = \pi r^2$

Trapezoid



$A = \frac{1}{2} h (b_1 + b_2)$

Square



$A = s^2$

$P = 4s$

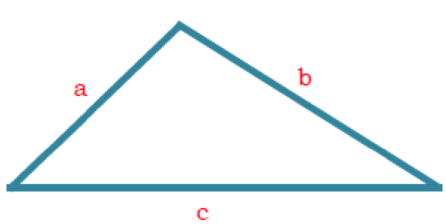
Area of Triangles:

The following ***triangle area*** formula was developed nearly 2000 years ago by a mathematician known as Hero of Alexandria!

Theorem 111: (Hero's Formula) $A_{\Delta} = \sqrt{s(s-a)(s-b)(s-c)}$,

where a, b, and c are the lengths of the sides of the triangle

and s = semiperimeter = $\frac{a+b+c}{2}$



REFERENCE SHEET

VOLUME	**Prism/Cylinder**	V = Bh *where **B** is the area of the base*
	Pyramid/Cone	V = $\frac{1}{3}$Bh *where **B** is the area of the base*
	Sphere	V = $\frac{4}{3}\pi r^3$

Lateral Area (L)	**Prism**	L = Ph *where **P** is the perimeter of the base*
	Cylinder	L = $2\pi rh$
	Pyramid	L = $\frac{1}{2}$P$\boldsymbol{\ell}$ *where $\boldsymbol{\ell}$ is the slant height*
	Cone	L = $\pi r\boldsymbol{\ell}$ *where $\boldsymbol{\ell}$ is the slant height*
	Sphere	V = $\frac{4}{3}\pi r^3$

Surface Area (S.A.)	**Prism/Cylinder**	S.A. = L + 2B *where **B** is the area of the base*
	Pyramid/Cone	S.A. = L + B *where **B** is the area of the base*
	Sphere	S.A. = $4\pi r^2$

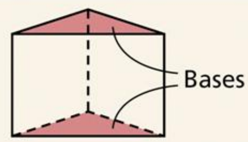
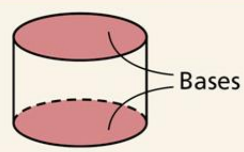
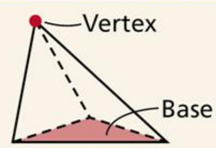
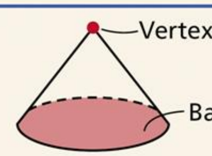
SWBAT: Calculate the volume of prisms and cylinders

<u>Volume of rectangular solids and cylinders – Day 1</u>

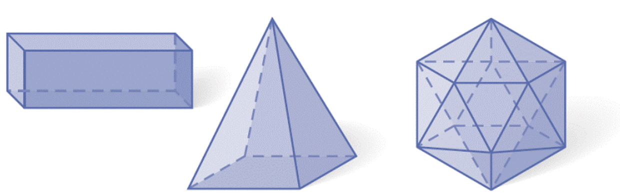
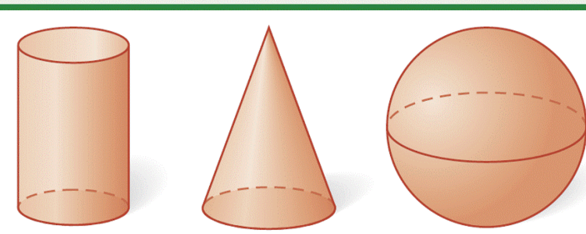
<u>Warm – Up: Read this section and Complete the puzzle on page 2.</u>

Three-dimensional figures, or solids, can be made up of flat or curved surfaces. Each flat surface is called a **<u>face</u>**.   An **<u>edge</u>** is the segment that is the intersection of two faces. A **<u>vertex</u>** is the point that is the intersection of three or more faces.   Each face of a solid figure is called either a **<u>base</u>** or a ***<u>lateral face</u>***.
Solid figures generally have one or two bases. If it has two, these bases are ***parallel***. If a figure has two parallel bases and lateral faces, such as in a prism, the bases will be perpendicular to the lateral faces.

Three-Dimensional Figures

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.	

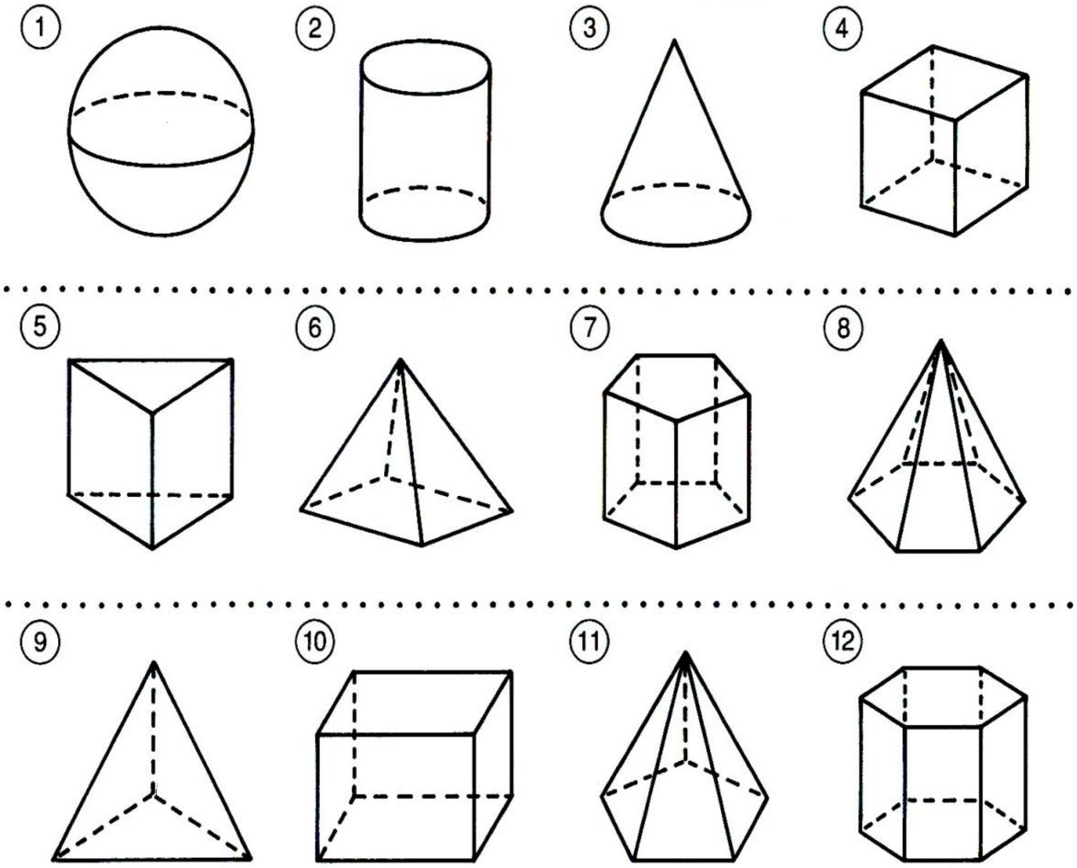
A **<u>polyhedron</u>** is formed by four or more polygons that intersect only at their edges. Prisms and pyramids are polyhedrons, but cylinders and cones are not.

Polyhedrons	Not polyhedrons
	

What Did the Taxi Driver Say About His Daughter?

Write the name that best describes each space figure. Then find your answer in the answer column. Write the letter of the answer in the box containing the number of the exercise.

6	4	9		2	11	5	7		10	1	12	8	3



(U) triangular pyramid

(T) hexagonal prism

(R) cone

(T) triangular prism

(E) sphere

(M) rectangular prism

(O) pentagonal prism

(O) cube

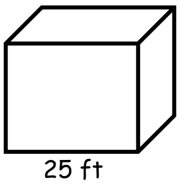
(U) pentagonal pyramid

(A) cylinder

(E) hexagonal pyramid

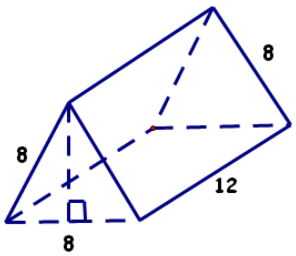
(Y) rectangular pyramid

Concept 1: Calculate the Volume of each Prism below.

1.


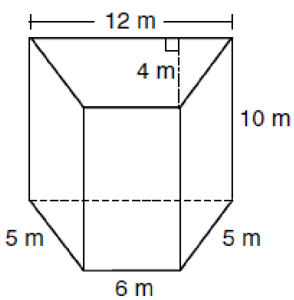
General Formula for Volume:

Formula Specific to Shape:

2.


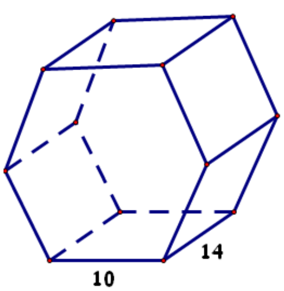
General Formula for Volume:

Formula Specific to Shape:

3.


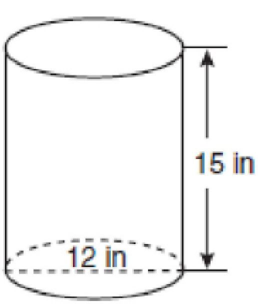
General Formula for Volume:

Formula Specific to Shape:

4.


General Formula for Volume:

Formula Specific to Shape:

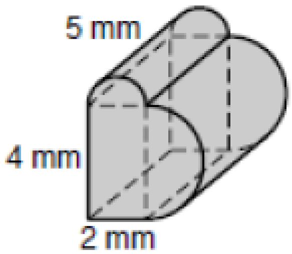
5.


General Formula for Volume:

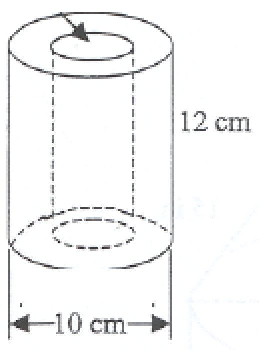
Formula Specific to Shape:

Find the volume of the composite figures below.

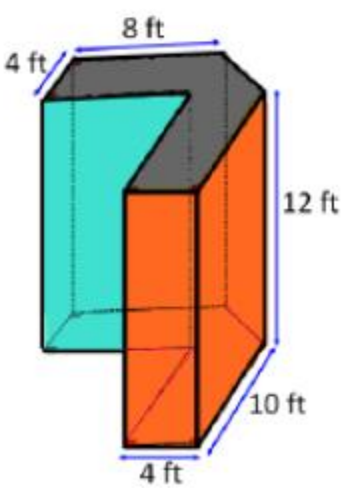
6.



7. Find the volume of the space inside the two cylinders.



8. Find the volume of the prism below. (Hint: Split the prism up into 3 three prisms.)



Working Backwards

9. A rectangular prism has a base with a length of 25, a width of 9, and a height of 12. A second prism has a square base with a side of 15. If the volumes of the two prisms are equal, what is the height of the second prism?

10. A cube has a volume of 3375 cubic units. Calculate the length of one side of the cube.

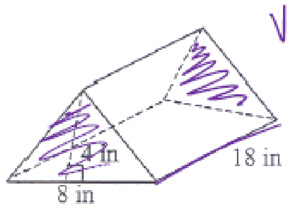
11. The volume of a cylinder is 441π in^3. The height of the cylinder is 9 in. Calculate the radius of the cylinder to the nearest tenth of a centimeter.

12. The volume of a cylinder is 794.3 cm^3. The height of the cylinder is 7 cm. Calculate the radius of the cylinder to the nearest tenth of a centimeter.

Summary:

Find the volume of each solid.

3.



$V = B \cdot h$

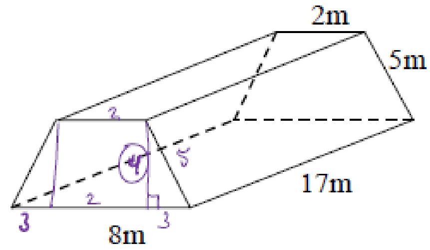
$\uparrow$

$A_\triangle$

$B = \frac{1}{2}(8)(4) = 16$

$V = 16 \cdot 18 = \boxed{288 \text{ in}^3}$

4.



$V = B \cdot h$

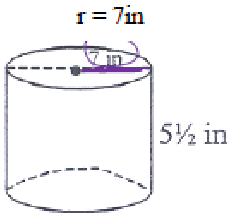
$\uparrow$

trap

$B = \frac{1}{2}h(b_1 + b_2) = \frac{1}{2}(4)(2+8) = 20$

$V = 20 \cdot 17 = \boxed{340 \text{ m}^3}$

5.

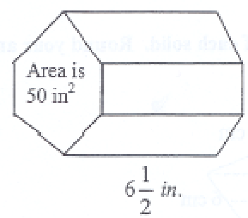


$V = \pi r^2 h$

$\pi(7^2)\, 5\frac{1}{2}$

$\boxed{\frac{539}{2}\pi \text{ in}^3}$

6.



$V = B \cdot h$

$= 50 \cdot 6\frac{1}{2}$

$= \boxed{325 \text{ in}^3}$

Exit Ticket:

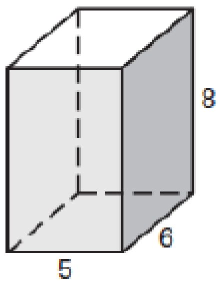
What is the volume, in cubic centimeters, of a cylinder that has a height of 15 cm and a diameter of 12 cm?

1) 180π
2) 540π
3) 675π
4) $2,160\pi$

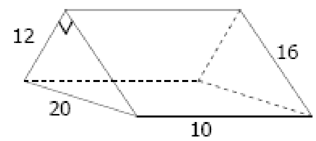
Homework - Volume of Prisms and cylinders – Day 1

Calculate the volume of each.

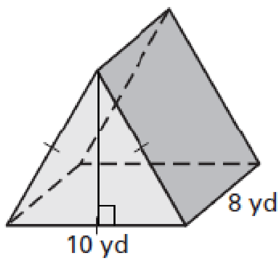
1.



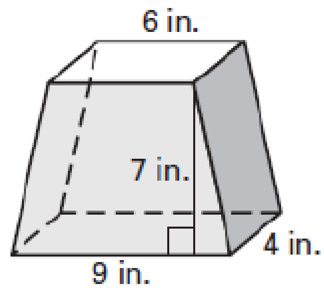
2.



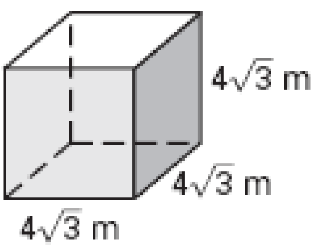
3.



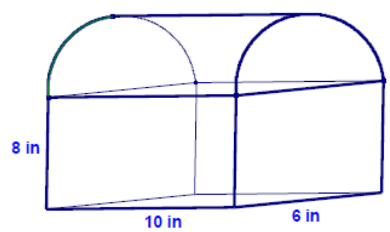
4.



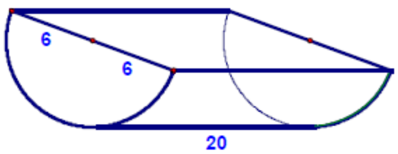
5. Leave answers exact.



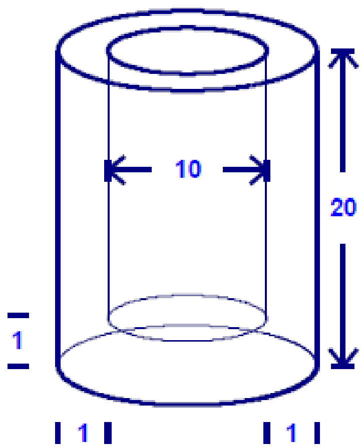
6. Round your answers to the nearest tenth.



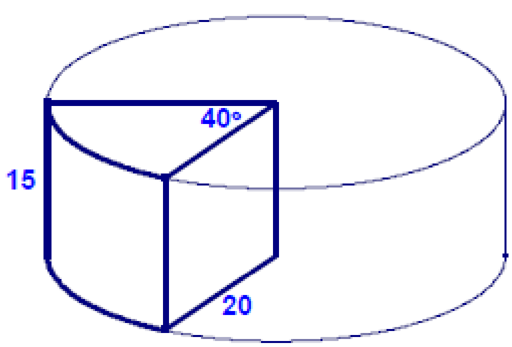
7. Find volume of the cylinder below. Leave your answers in terms of π.



8. A cistern is to be built of cement. The walls and bottom will be 1 ft. thick. The outer height will be 20 ft. The inner diamter will be 10 ft. To the nearest cubic foot, how much cement will be needed for the job?



9. A wedge of cheese is cut from a cylindrical block.
this wedge.

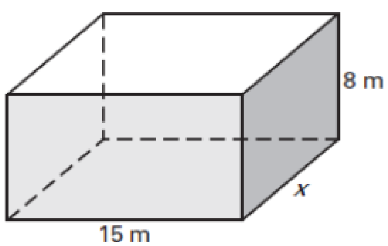


Word Problems

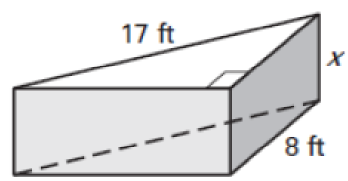
10. The volume of a cube is 216 cubic yards. Find the side length.

11. Julia has a rectangular prism with a length of 10 centimeters, a width of 2 centimeters, and an unknown height. He needs to build another rectangular prism with a length of 5 centimeters and the same height as the original prism. The volume of the two prisms will be the same. Find the width, in centimeters, of the new prism.

12. $V = 1440\ m^3$



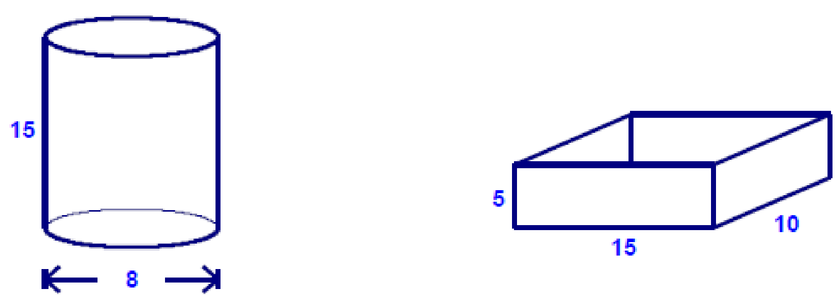
12. $V = 360\ ft^3$



13. The volume of a right cylinder is 3600π cubic centimeters and the height is 16 centimeters. Find the radius.

14. A right circular cylinder has a volume of 2,000 cubic inches and a height of 4 inches. What is the radius of the cylinder to the *nearest tenth of an inch*?

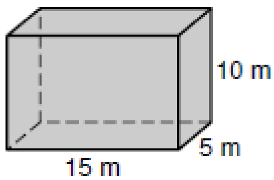
15. The cylindrical glass is full of water, which is poured into the rectangular pan. Will the pan overflow? If yes, by how much? All measurements are in cm.



SWBAT: Calculate the Volume of Pyramids, Cones, and Spheres – Day 2

Warm - Up

Calculate the volume of the prism below.



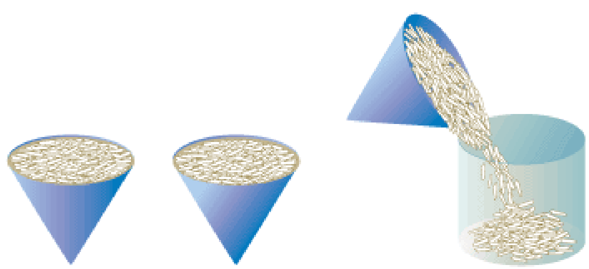
Describe the effect of each change on the volume of the given figure.

a) ***If the dimensions are doubled.***

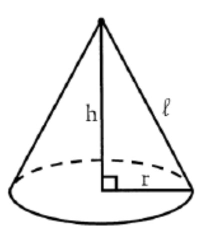
b) ***If the dimensions are divided by 5.***

∴

Volume of a Pyramids and Cones

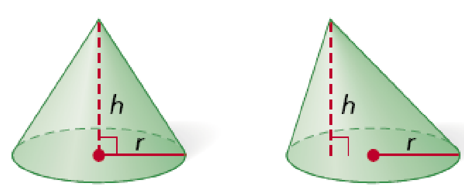


The cones and the cylinder have the same base and height.
It takes three cones full of rice to fill the cylinder.



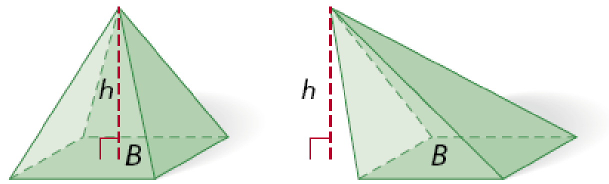
Volume of Cones

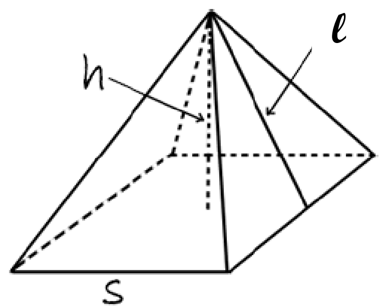
The volume of a cone with base area B, radius r, and height h is $V = \frac{1}{3}Bh$, or $V = \frac{1}{3}\pi r^2 h$.



Volume of a Pyramid

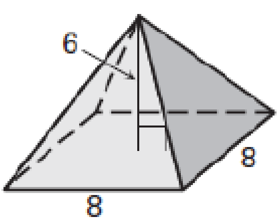
The volume of a pyramid with base area B and height h is $V = \frac{1}{3}Bh$.





Concept 1: Calculate the Volume of each shape below.

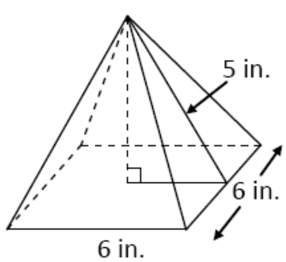
1.



General Formula for Volume:

Formula Specific to Shape:

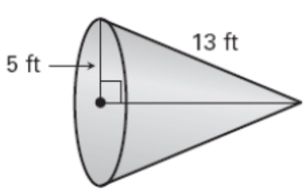
2.



General Formula for Volume:

Formula Specific to Shape:

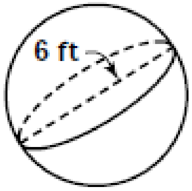
3.



General Formula for Volume:

Formula Specific to Shape:

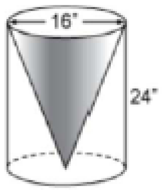
4.



Formula Specific to Shape:

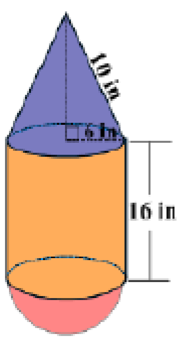
5.

What is the volume left in the cylinder after the shaded cone region is removed?



6.

A child's toy is fully filled with a heavy liquid in the hemisphere and lighter liquids in the cone and cylinder so that the toy will always right itself (stand up straight) as it is shown in the picture. How much total liquid is contained inside of the toy? (Radius of cone is 6 inches)



7.

The figure shows a can of three tennis balls. The can is just large enough so that the tennis balls will fit inside with the lid on. The diameter of each tennis ball is 2.5 in. Find the volume of empty space inside the can.

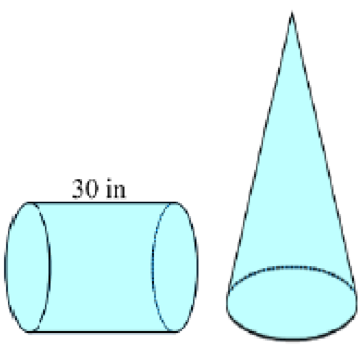
Word - Problems

8. Find the radius of a sphere with volume $7776\pi\,\text{ft}^3$.

9. A cube with sides 5 inches, and a pyramid with base edges 5 inches. What is the height, so that the volume of the cube and the pyramid are equal?

10. A right cone has a height of 6 feet and a volume of 32π cubic feet. What is its radius?

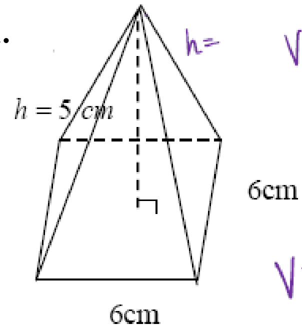
11. The cone and the cylinder below have the same base area and the same volume. Find the **height** of the cone.



Summary

Calculate the volume of each shape.

a.



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

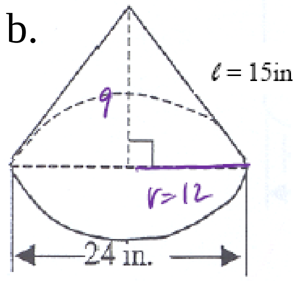
square

$B = 6^2 = 36$

$V = \frac{1}{3}(36)(5)$

$= \boxed{60 cm^3}$

b.



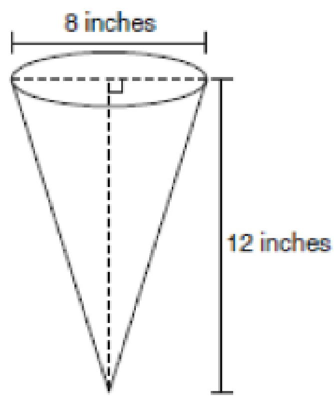
$V = \frac{1}{3}\pi r^2 h$

$\frac{1}{3}\pi \cdot (12^2)(9)$

$\boxed{432\pi \text{ in}^3}$

Exit Ticket

In the diagram below, a right circular cone has a diameter of 8 inches and a height of 12 inches.



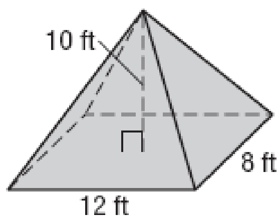
What is the volume of the cone to the *nearest cubic inch*?

1) 201
2) 481
3) 603
4) 804

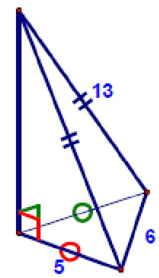
Homework - Volume of Pyramids and Cones – Day 2

Calculate the volume of each. Leave answers exact.

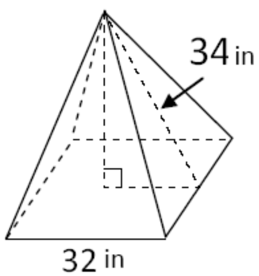
1.



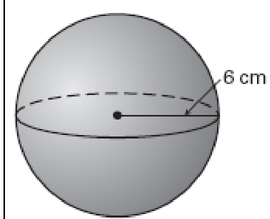
2.



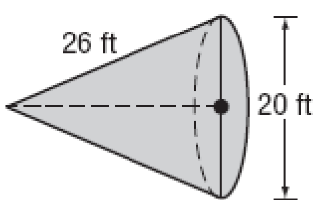
3.



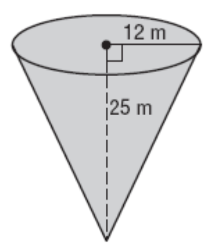
4.



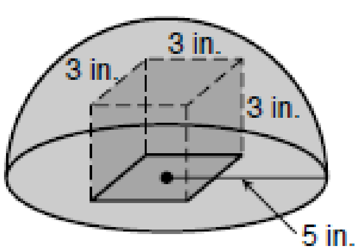
5.



6.



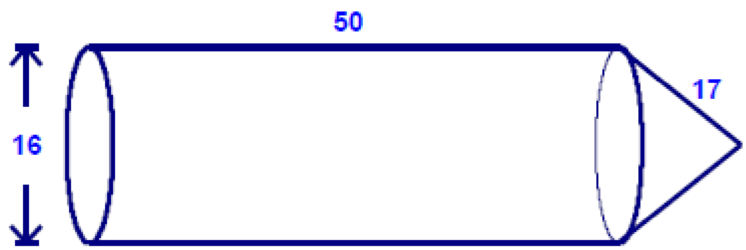
7. Calculate the volume inside the hemisphere.



Composite Figures

8.

A rocket has the dimensions shown. If 60% of the space in the rocket is needed for fuel, what is the volume, to the nearest whole unit, of the portion of the rocket that is available for nonfuel items?



9. Use the diagram to find

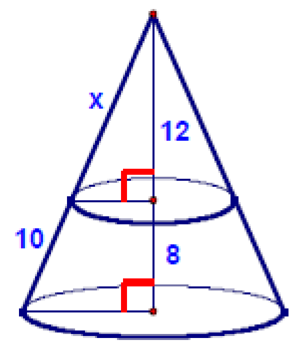
a. x

b. the radii of the circles

c. The volume of the smaller cone

d. The volume of the larger cone

e. The volume of the frustum



Word Problems

10. The volume of a square pyramid is $605m^3$. Calculate the dimensions of the base of the square if the pyramid has a height of 15m.

10. Find the radius of a sphere with volume 2304π yd^3.

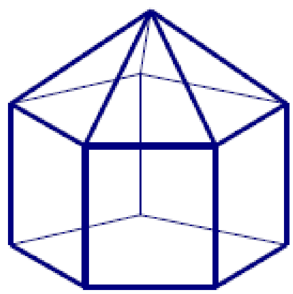
11. A cone has a volume of $432\pi\ cm^3$ and a height of 9 cm.
   a) Calculate the radius of the cone
   b) Calculate the slant height of the cone.

12. Find, to the nearest tenth, the volume of a cone with a 60° vertex angle and a slant height of 12.

<u>**Surface area of rectangular prisms and cylinders – Day 3**</u>

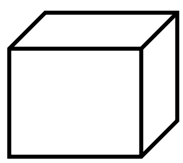
<u>**Warm – Up**</u>

A gazebo (garden house) has a pentagonal base with an area of 60 m^2. The total height to the peak is 16 m. The height of the pyramidal roof is 6 m. Find the gazebo's total volume.



Concept 1: Calculate the Lateral and Surface Area of each Prism below.

1.



14 in

General Formula for Surface Area:

Formula Specific to Shape:

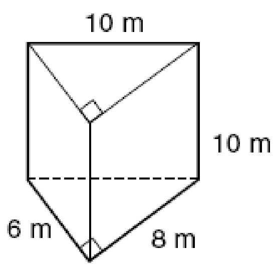
LA = ____________

SA = ____________

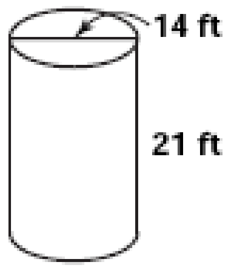
2.

General Formula for Surface Area:

Formula Specific to Shape:



3.



General Formula for Surface Area:

Formula Specific to Shape:

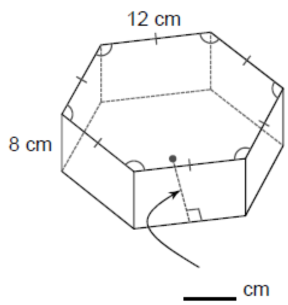
LA = ____________

SA = ____________

4.

General Formula for Surface Area:

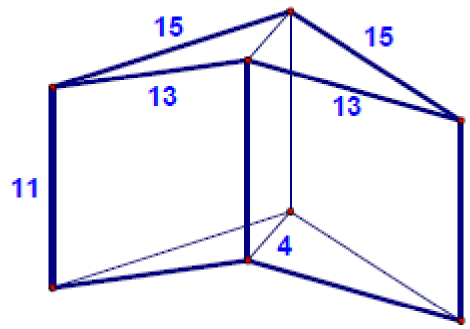
Formula Specific to Shape:



LA = ______________

SA = ______________

5. Find the lateral area and the total area of the right prism shown



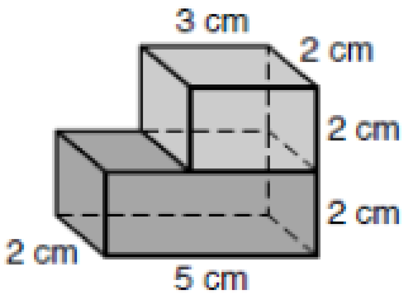
LA = ____________

SA = ____________

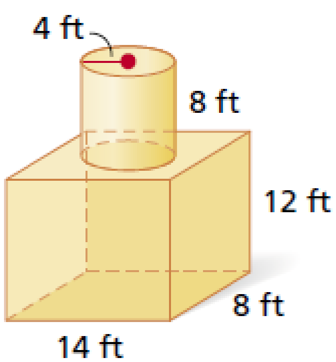
Calculating Surface Area of Composite Figures

1) **Identify the different types of figures that make up the solid.**
2) **Identify what parts of each figure are on the surface of the solid.**
3) **Calculate the surface area of composite shapes.**

6.

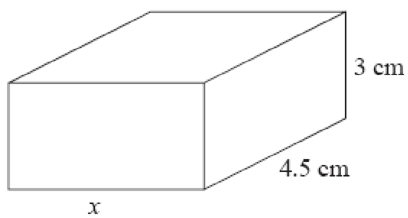


7.



Working Backwards

8. The surface area of the prism below is 102 cm^2. Find x



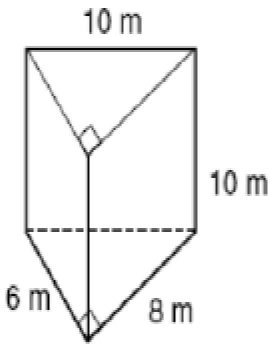
9. The surface area of a cube is 24 cm^2. Find the length of each side of the cube.

10. A cylinder has a surface area of 200π ft^2.

a) Calculate the radius of the cylinder if the height is 15 feet.

b) Calculate the Lateral Area of the cylinder.

Summary:



General Formula for Surface Area: $SA = L + 2B$

Formula Specific to Shape: $SA = PH + 2\left(\frac{1}{2} \cdot b \cdot h\right)$

$SA = (6 + 8 + 10) \cdot 10 + 2\left(\frac{1}{2} \cdot 8 \cdot 6\right)$

$SA = 24 \cdot 10 + 2 \cdot 24$

$SA = 240 + 48$

$SA = 288 \text{ m}^2$

LA = 240 m^2

SA = 288 m^2

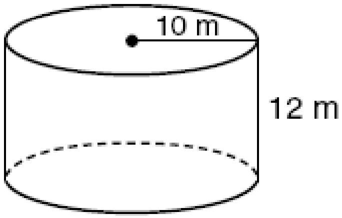
Exit Ticket

A right circular cylinder has an altitude of 11 feet and a radius of 5 feet. What is the lateral area, in square feet, of the cylinder, to the *nearest tenth*?

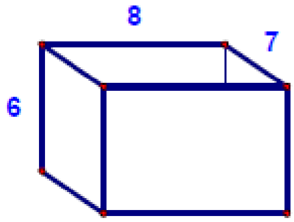
1) 172.7	3) 345.4
2) 172.8	4) 345.6

Homework - Surface area of rectangular prisms and cylinders – Day 3

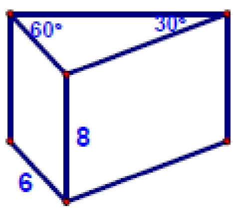
1. Find the surface area, to the *nearest tenth of a square foot*, of this container assuming it has a closed top and bottom.



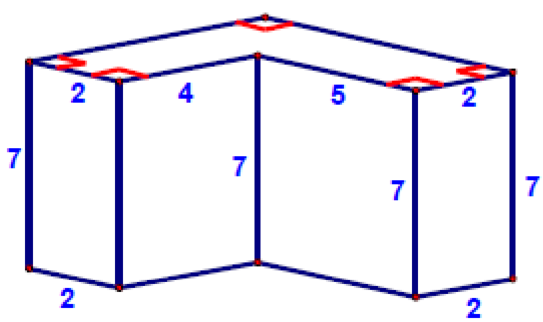
2. Find the total area of the pieces of cardboard needed to construct the open box shown



3. Find the total area of the pieces of cardboard needed to construct the open box shown

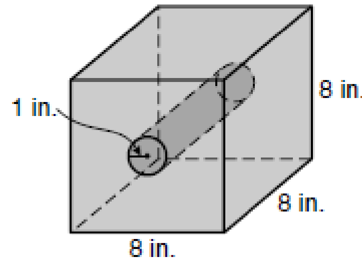


4. Find the area of the right prism shown



5. **A builder drills a hole through a cube of concrete, as shown in the figure. This cube will be an outlet for a water tap on the side of a house.**

Find the surface area of the figure.



6. A cube has a surface area of 486 cm^2. Calculate the length of one side of the cube.

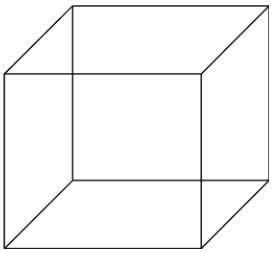
7. The surface area of a cylinder is 48π square feet. The radius of the cylinder is 3 feet. What is the height of the cylinder?

8. The lateral area for a hexagonal prism measures 432 $inches^2$. Calculate the surface area of the prism if the height of the prism measures 9 inches.

Calculate the Surface Area of Pyramids, Cones, and Spheres – Day 4

<u>Warm – Up</u>

Calculate the surface area of the cube below.



Describe the effect of each change on the surface of the given figure.

a) If the dimensions are doubled.

b) If the dimensions are divided by 5.

$\therefore$

Example 1:

The surface area of a cube is increased so that it is 9 times its original surface area. How did the length of the cube change?

A The length was doubled.

B The length was tripled.

C The length was quadrupled.

D The length was multiplied by 9.

Example 2:

A cylinder has a volume of 4π cm^3. If the radius and height are each tripled, what will be the new volume of the cylinder?

F 12π cm^3

G 36π cm^3

H 64π cm^3

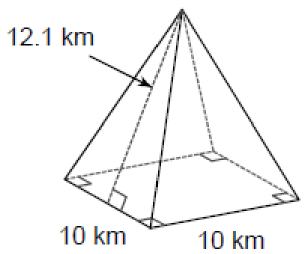
J 108π cm^3

Concept 1: Calculate the Lateral and Surface Area of each Pyramid/Cone below.

1.

General Formula for Surface Area:

Formula Specific to Shape:



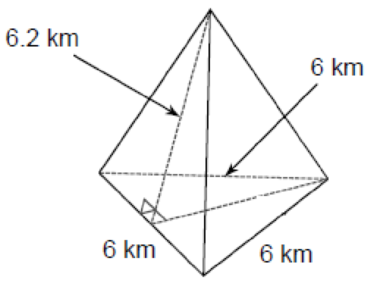
LA = ____________

SA = ____________

2.

General Formula for Surface Area:

Formula Specific to Shape:



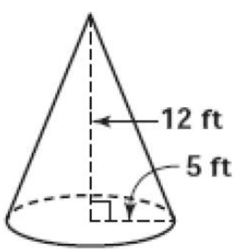
LA = ____________

SA = ____________

3.

General Formula for Surface Area:

Formula Specific to Shape:

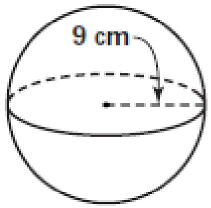


LA = ____________

SA = ____________

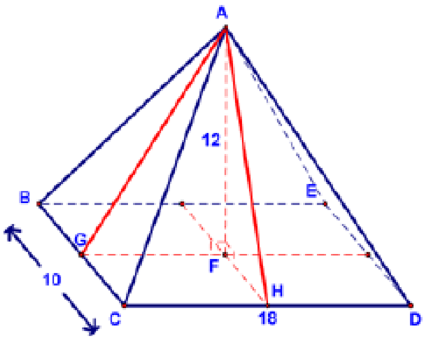
4.

Formula Specific to Shape:

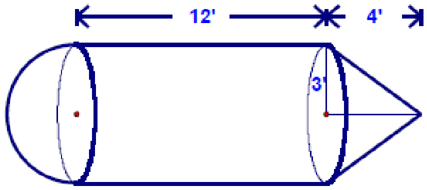


SA = ____________

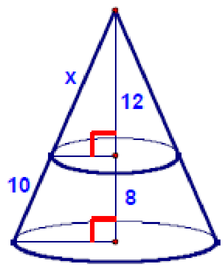
5. **Find the total surface area of the rectangular right pyramid (measurements in cm):**



6. Find the total surface area of the figure below.



7. ******* Calculate the surface area of the frustum below. ********



Word Problems

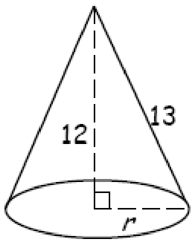
7. Find the slant height of a regular hexagonal pyramid with base edge length 6 cm, and lateral area 198 cm^2

8. A cone has a lateral area of 72π and a total surface area of 121π. Find its radius.

9. Find the volume of the sphere if the surface area is represented by 196π.
Leave your answer in terms of π.

Summary

Find the lateral area and total surface area of the cone.

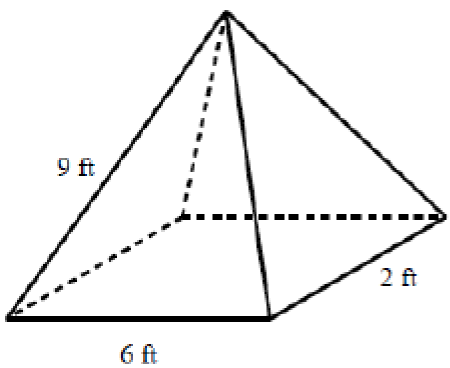


Use the Pythagorean Theorem (or a Pythagorean triple) to find r.

$$h^2 + r^2 = l^2$$
$$12^2 + r^2 = 13^2$$
$$r = 5.$$
$$LA = \pi r l = \pi(5)(13) = 65\pi$$
$$S = \pi r^2 + \pi r l \text{ or } \pi r^2 + LA$$
$$= \pi(5)^2 + 65\pi = 90\pi \text{ units}^2.$$

Exit Ticket

The pyramid shown has a rectangular base and faces that are isosceles triangles. Find the total surface area to the nearest tenth.

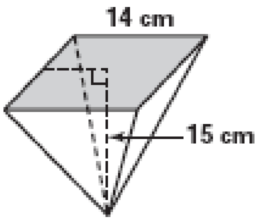


[A] 203.6 ft^2 [B] 80.8 ft^2 [C] 84.0 ft^2 [D] 36.0 ft^2

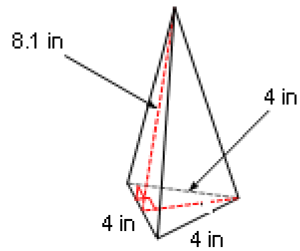
Day 4 – Homework

Find the Lateral Area and Surface Area of each.

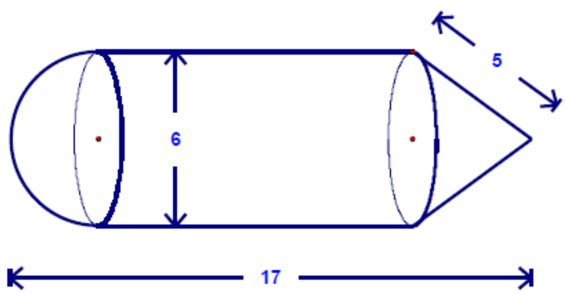
1.



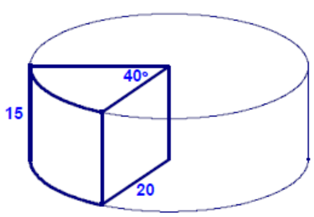
2.



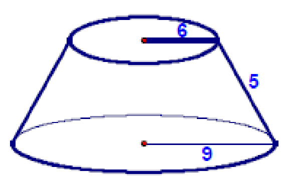
3. Find surface Area only.



4. Find the Surface area.



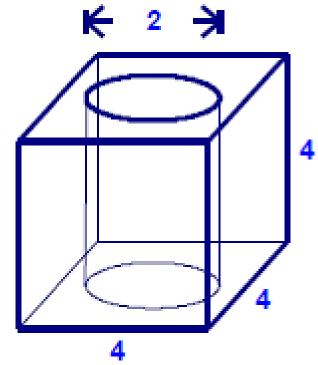
5. Find the Surface area.



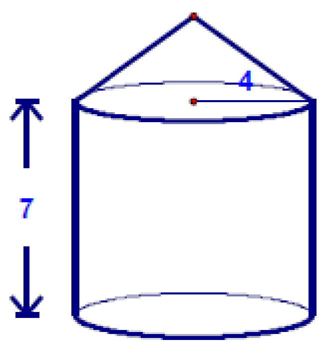
Word Problems

6. To the nearest tenth, what is the total surface area (including the inside of the hole) of a single cube?

The manufacturer claims that these cubes cool a drink twice as fast as regular cubes of the same size. Verify whether this claim is true by a comparision of surface areas. (Hint: The ratio of areas is equal to the ratio of cooling speeds.)



7. The total height of the tower shown is 10 m. If one liter of paint will cover an area of 10 m^2, how many 1 liter cans of paint are needed to paint the entire tower? All measurements are in meters. (Hint: First find the total area to be painted, using 3.14 for π)



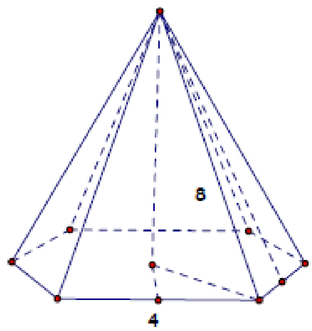
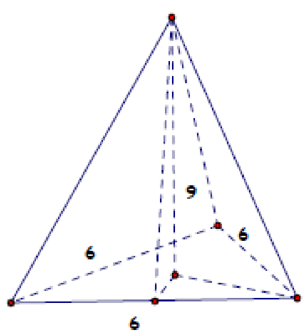
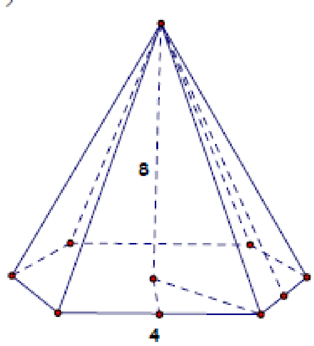
8. Find the slant height of a regular square pyramid with base edge length 4 cm, if its lateral area is 72 cm^2.

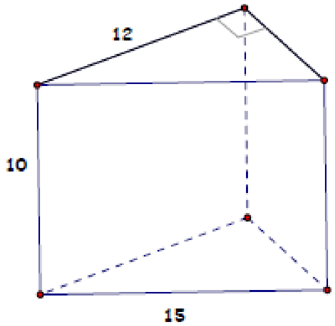
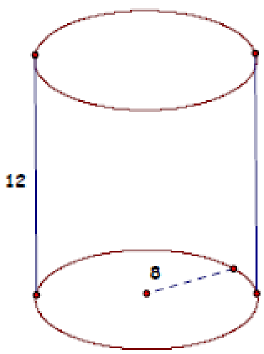
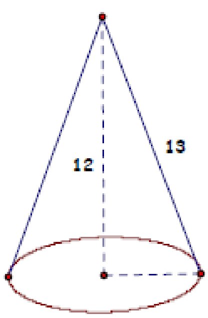
9. A cone has lateral area 100π and total surface area 136π. Find its radius.

10. If the surface area of a sphere is represented by 900π, What is the volume in terms of π?

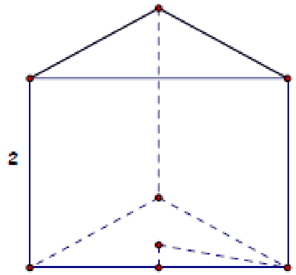
Day 5 – Review

1. Find the lateral area, surface area, and volume of each figure. (Figures c, d, e, and i have regular bases.)

Figure	Lateral Area	Surface Area	Volume
a) 			
b) 			
c) 			

d) 			
e) 			
f) 			

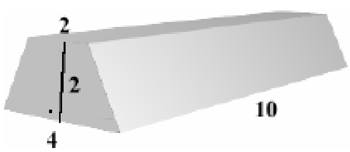
2. Find the surface area of a right prism with equilateral triangular bases if the edges are all 2 units long.



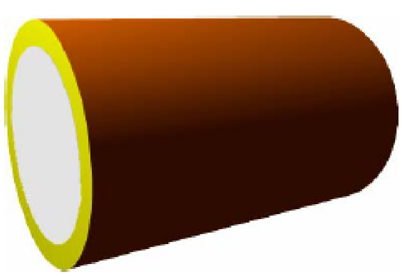
3. Find the height of a pyramid if its volume is 2500 cm^3 and the base is an equilateral triangle 15 cm on a side.

4. A prism with a regular hexagonal base and height 3 cm has a volume of $288\sqrt{3}$ cm^3. Find the length of each edge of the base.

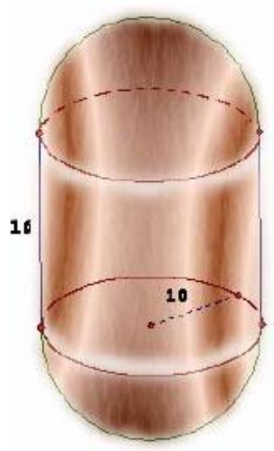
5. A silver ingot is molded into a bar shaped as shown. The ends are parallel isosceles trapezoids. Find the volume of the ingot.



6. Copper pipe 8 in long has an inside diameter of .5 in and an outside diameter of .65 in. Find the volume of the copper in this pipe.

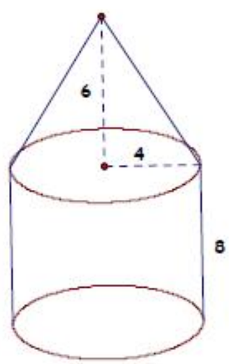


7. Find the volume and surface area of the figure shown below.



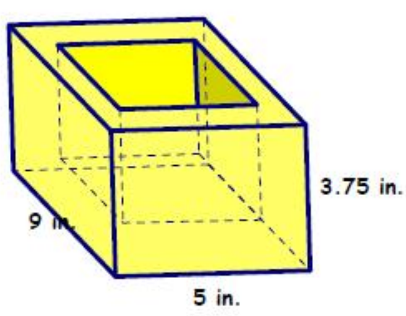
8. Find the surface area and volume of the figures shown below.

a)



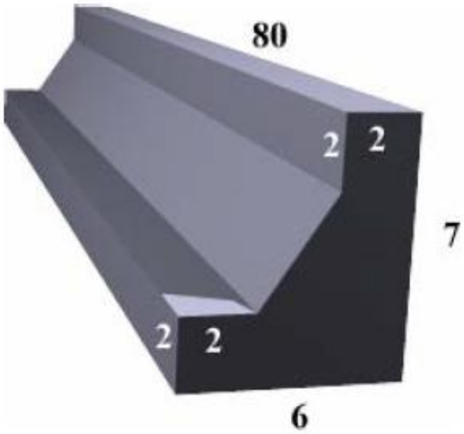
b)

9. A box mold as shown in the illustration can be used for making bricks. If the walls are ½ in. thick and the bottom is ¾ in thick, what is the volume of the brick made with this mold?



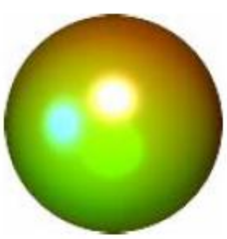
10. All edges of a right prism with a regular hexagonal base are equal in length. If the volume is $27\sqrt{3}\ \text{cm}^3$, find the length of each edge.

11. A concrete retaining wall is 80 ft long and has a cross section as shown. How many cubic yards of concrete are used in constructing the wall?



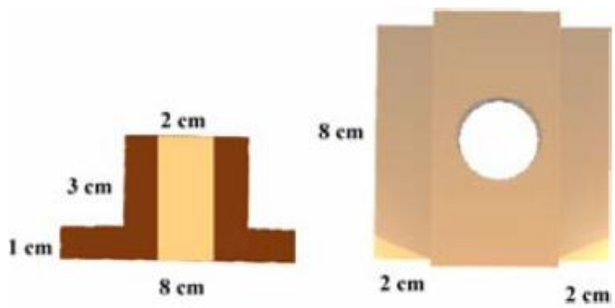
12. This "hourglass" consists of two identical cones contained in a right cylinder. The cylinder is 6 cm tall and the radius of the base is 3 cm. Find the volume of the space between the cylinder and the two cones.

13. Find the volume of a sphere with a radius of 3 cm.

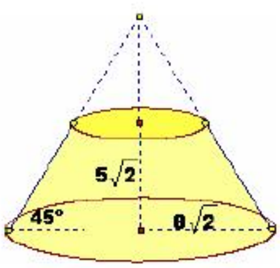


14. A cylindrical hole with a diameter of 8 in. is bored (cut) through a cube 10 in. on a side. Find the surface area and volume of the figure.

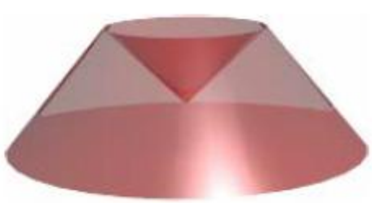
15. Find the surface area and volume of this solid casting.



16. Find its volume and surface area of this frustum.



17. This solid is formed by cutting a cone with a slice parallel to the base of the cone, and then boring a cone-shaped cut into the resulting solid. If the height of the original cone is 16 units, the height of the resulting solid 8 units, and the height of the cone bored out is 5 units, and the radii of the bottom and top of the resulting solid are 12 and 6 respectively, what are the surface area and volume of the resulting solid?



Day 6 – Review #2

What to know for the Chapter 12 Test

Definitions

- Polyhedron
- Regular polyhedron
- Lateral Surface Area
- Total Surface Area
- Prism
  - Right Prism
  - Oblique Prism
  - Altitude of a Prism
- Pyramid
  - Base of a Pyramid
  - Lateral Faces of a Pyramid
  - Altitude of a Pyramid
- Sphere
- Hemisphere
- Cylinder
  - Radius of a Cylinder
  - Right Cylinder
- Cone
  - Radius of a Cone
  - Altitude of a Cone
  - Right Cone
- Volume

Postulates

- Surface Area of a Sphere

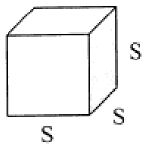
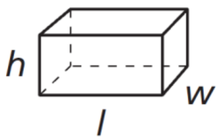
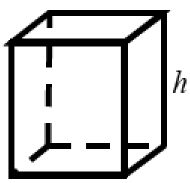
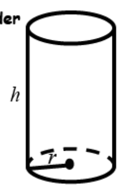
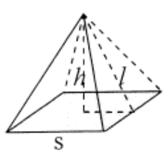
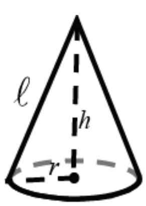
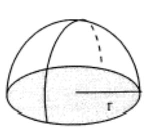
Theorems

- Lateral Surface Area of a Cylinder (Theorem 113)
- Lateral Surface Area of a Cone (Theorem 114)
- Volume of a Prism or Cylinder (Theorem 118)
- Volume of a Pyramid or a Cone (Theorems 119 & 120)
- Volume of a Sphere (Theorem 122)

Problem Types

- Finding Lateral Surface Area and Total Surface Area of Prisms
- Finding Lateral Surface Area and Total Surface Area of Pyramids
- Finding the Lateral Surface Area and Total Surface Area of Cylinders
- Finding the Lateral Surface Area and Total Surface Area of Cones
- Finding the Surface Area of a Sphere
- Find the Lateral Surface Area and Total Surface Area of a hemisphere
- Finding the Volume of Prisms & Cylinders
- Finding the Volume of Pyramids & Cones
- Finding the Volume of Spheres
- Finding Surface Area and Volume of combined shapes (e.g., frustums, prisms & cylinders with holes cut out, spheres with slices cut out, an ice cream cone, etc.)
- Determining "surfaces of rotation"

Give the appropriate formula for computing the volume, surface area, and lateral area for each 3-D figure. You should fill this in completely from memory.

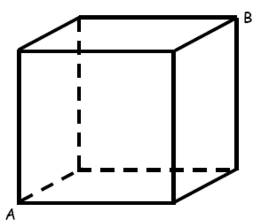
Solid	Lateral Area	Surface Area	Volume
Cube 			
Rectangular prism 			
Any Prism 			
Cylinder 			
Any Regular Pyramid 			
Cone 			
Sphere 			
Hemisphere 			

Part 1: Level B – Solve the following problems. You must show an algebraic setup for every problem on this review to receive homework credit!

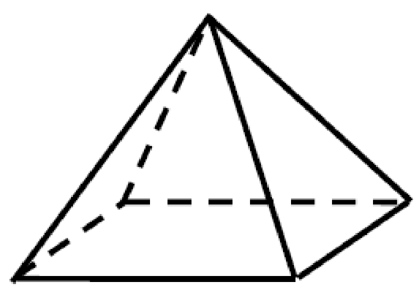
1. The volume of a sphere is 2304π mm^3. Find the surface area of the sphere.

2. Find the radius of a sphere whose volume equals its surface area.

3. The cube has a volume of 64 cubic centimeters. Find AB.

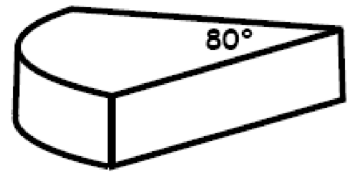


4) A right, square pyramid has lateral edges that measure 8 in. The lateral faces of the pyramid are equilateral triangles. Find the surface area and volume of the solid.



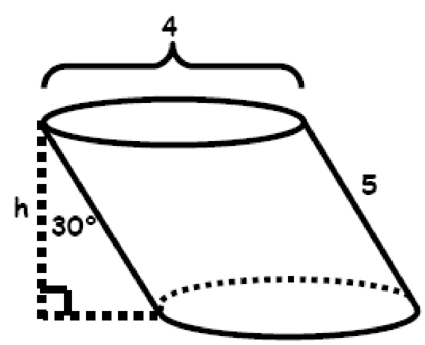
5) A wheel of Gouda cheese has a diameter of 32 in and a height of 6 inches. You buy an 80° wedge from that wheel.

a) Calculate the volume of your cheese wedge.

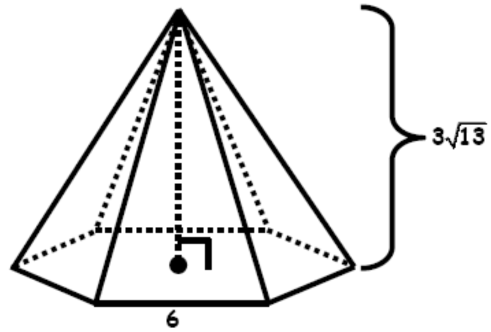


b) Calculate the surface area of your cheese wedge.

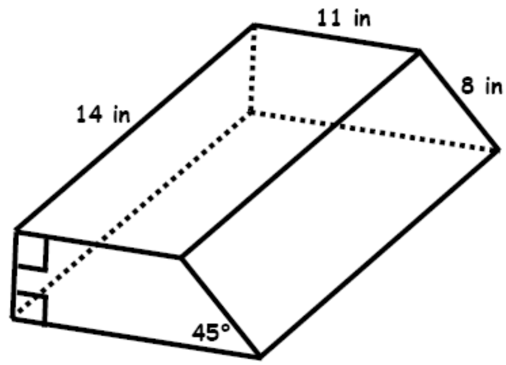
6) **Find the volume and surface area of the following non-right, circular cylinder. The slant height is 5 and the diameter of the base is 4.**



7) Find the surface area and volume of the right, regular hexagonal pyramid. The base edges are 6 and the height is $3\sqrt{13}$.

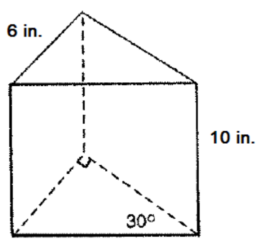


8) Find the surface area and volume of the right prism.

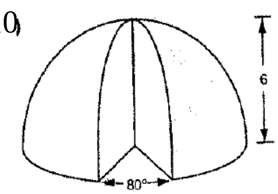


Calculate the surface area and volume of each shape.

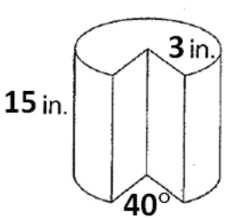
9.



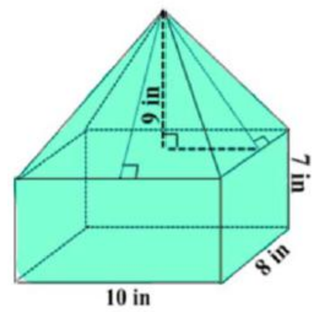
10)



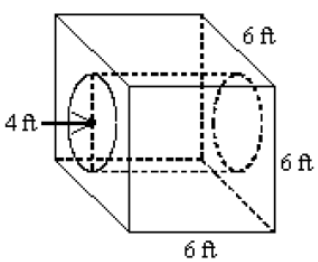
11.



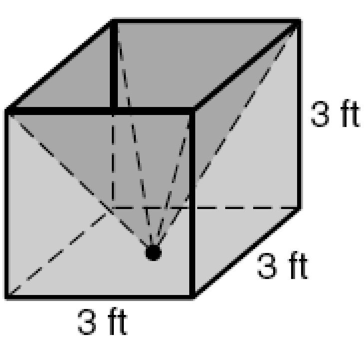
12. A paper house is constructed with the dimensions shown. The roof is a rectangular pyramid and the body is a rectangular prism. How many square inches of paper will be used to make the house?



13. A concrete block has a cylindrical hole 4 feet in diameter drilled through it to allow a pipe to pass through. How many cubic feet of concrete are left in the block? Round your answer to the nearest tenth.



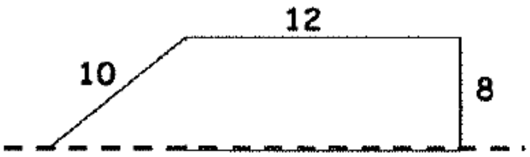
14. Find the surface area of the composite figure. The figure is a cube with a regular pyramid cut out as shown.



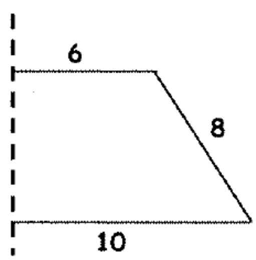
Level C – Challenge Questions

The figure shown below is rotated about the dotted line. Find the volume and surface area.

15.



16.



SUMMARY

Formulas for the lateral area LA, total surface area S and volume V of the more common solids are given below.

PRISM	CYLINDER	PYRAMID	CONE	SPHERE
perimeter of base P, height h, Area of Base B, length l and width w	radius r and height h	perimeter of base P, slant height l, Area of Base B, and height h	radius r, slant height l, and height h	radius r
$LA = Ph$	$LA = 2\pi rh$	$LA = \frac{1}{2}Pl$	$LA = \pi rl$	
$S = 2B + Ph$ $S = LA + 2B$ *Rectangular Prism:* $S = 2lw + 2lh + 2wh$ Cube: $S = 6s^2$	$S = 2\pi r^2 + 2\pi rh$	$S = B + \frac{1}{2}Pl$	$S = \pi r^2 + \pi rl$	$S = 4\pi r^2$
$V = Bh$ *Rectangular Prism:* $V = lwh$ Cube: $V = s^3$	$V = \pi r^2 h$	$V = \frac{1}{3}Bh$	$V = \frac{1}{3}\pi r^2 h$	$V = \frac{4}{3}\pi r^3$

In a PRISM or PYRAMID: Area of Base *(B)*... will be replaced with the appropriate area formula, to match the shape of the base.	
SQUARE	$A = s^2$
RECTANGLE	$A = bh$
TRIANGLE	$A = \frac{1}{2}bh$
PARALLELOGRAM	$A = bh$
TRAPEZOID	$A = \frac{1}{2}h(b_1 + b_2)$
RHOMBUS/KITE	$A = \frac{1}{2}d_1 d_2$
EQUILATERAL TRIANGLE	$A = \frac{1}{4}s^2\sqrt{3}$
REGULAR POLYGON	$A = \frac{1}{2}aP$

Name ________________________ Teacher __________ Class/Period _______________
Due: __________________________

Extra Credit

Find the total volume of the castle, including the towers.