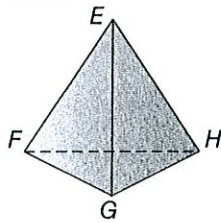


12-1 Study Guide and Intervention

Three-Dimensional Figures

Identify Three-Dimensional Figures A **prism** is a polyhedron with two parallel, congruent **bases**. A **pyramid** is a polyhedron with one base. Prisms and pyramids are named by the shape of their bases, such as triangular or rectangular.

Example 1



Identify the figure. Name the bases, faces, edges, and vertices.

This figure has one triangular base, $\triangle FGH$, so it is a triangular pyramid.

faces: EFG , EGH , EFH , FGH

edges: \overline{EF} , \overline{EG} , \overline{EH} , \overline{FG} , \overline{FH} , \overline{GH}

vertices: E , F , G , H

Example 2



Identify the figure. Name the bases, faces, edges, and vertices.

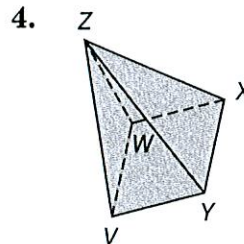
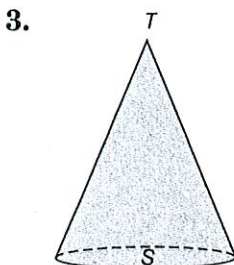
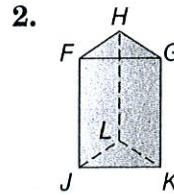
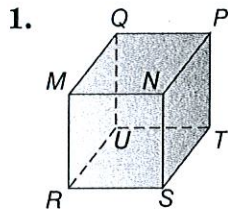
This figure has two circular bases, A and B , so it is a cylinder.

faces: A and B

The figure has no edges and no vertices.

Exercises

Identify each figure. Name the bases, faces, edges, and vertices.

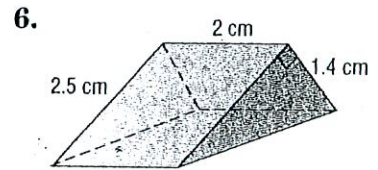
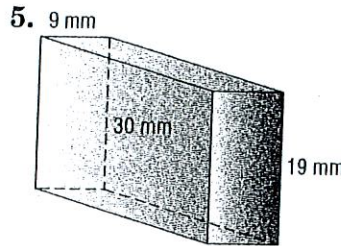
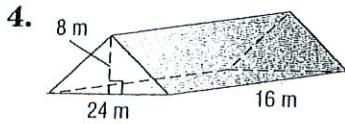
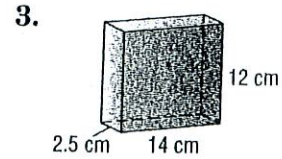
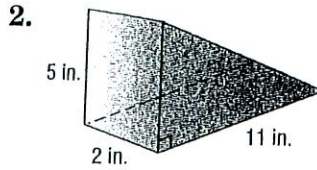
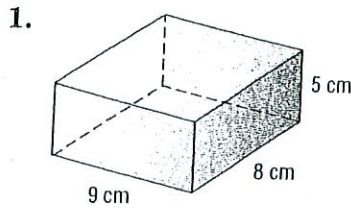


12-2 Practice

A calculator is allowed ☺

Volume of Prisms

On a separate piece of paper, find the volume of each figure. Round to the nearest tenth. Be sure to give the formula, steps, and answer.

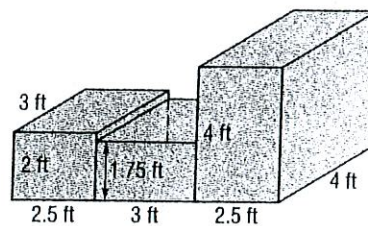


7. Rectangular prism: length 22.5 feet, width 12.5 feet, height 1.2 feet

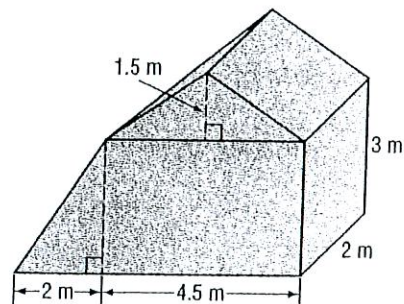
8. Triangular prism: base of triangle 17 centimeters, height of triangle 3 centimeters, height of prism 10.2 centimeters

9. Find the height of a rectangular prism with a length of 11 meters, a width of 0.5 meter, and a volume of 23.1 cubic meters.

10. **FORTS** Gina and her sister built a fort out of boxes. What is the volume of the fort?



11. **SHEDS** Mr. Wilkins is building a shed. The sketch shows the dimensions of the shed. What is the volume of the shed?



12-3 Skills Practice

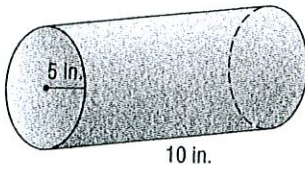
A calculator is allowed 😊

$\pi = 3.14$

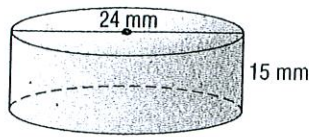
Volume of Cylinders

On a separate piece of paper, find the volume of each cylinder. Round to the nearest tenth. Be sure to give the formula, steps, and answer.

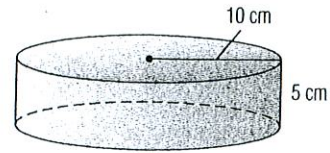
1.



2.



3.



4. radius: 12.4 m
height: 5.2 m

5. radius: 5.5 ft
height: 14 ft

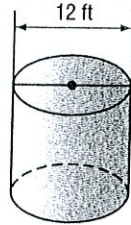
6. diameter: 12.5 in.
height: 16.25 in.

On a separate piece of paper, find the height of each cylinder. Round to the nearest tenth. Be sure to give the formula, steps, and answer.

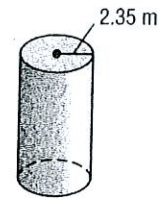
7. Volume: 1,494.1 m³



8. Volume: 1,073.9 ft³



9. Volume: 31.2 m³



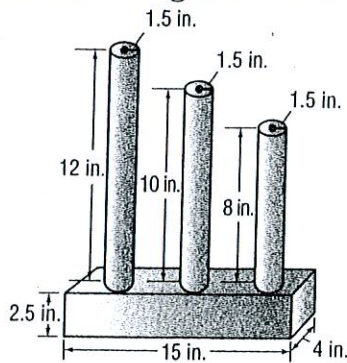
10. radius: 4.6 cm
volume: 850.5 cm³

11. radius: 17 ft
volume: 1,361.2 ft³

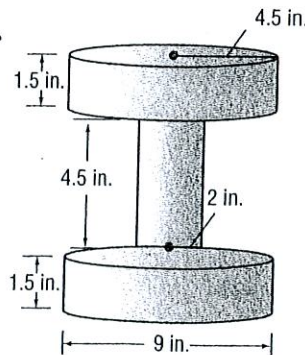
12. diameter: 32 yd
volume: 3,215.4 yd³

On a separate piece of paper, find the volume of each figure. Round to the nearest tenth. Be sure to give the formula, steps, and answer.

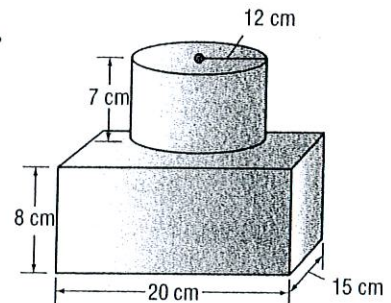
13.



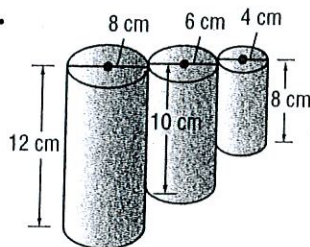
14.



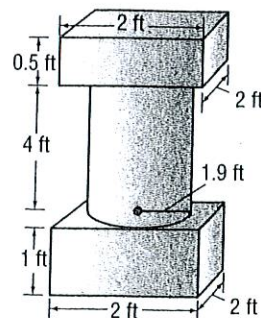
15.



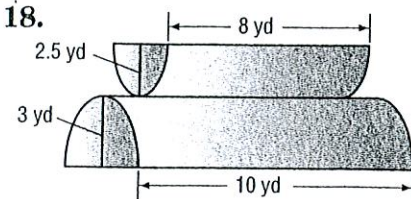
16.



17.



18.



12-4 Study Guide and Intervention A calculator is allowed ☺

Volume of Pyramids, Cones, and Spheres

Volume of a Pyramid A pyramid has $\frac{1}{3}$ the volume of a prism with the same base and height. To find the volume V of a pyramid, use the formula $V = \frac{1}{3}Bh$, where B is the area of the base and h is the height of the pyramid.

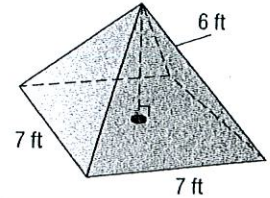
Example 1 Find the volume of the pyramid.

$V = \frac{1}{3}Bh$ Volume of a pyramid

$V = \frac{1}{3}(7 \cdot 7 \cdot 6)$ The base is a square, so $B = 7 \cdot 7$. The height of the pyramid is 6 ft.

$V = 98$ Simplify.

The volume is 98 ft³.



Volume of a Cone A cone has $\frac{1}{3}$ the volume of a cylinder with the same base and height. To find the volume V of a cone, use the formula $V = \frac{1}{3}\pi r^2h$, where r is the radius and h is the height of the cone.

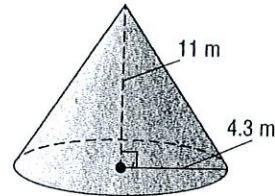
Example 2 Find the volume of the cone. Round to the nearest tenth.

$V = \frac{1}{3}\pi r^2h$ Volume of a cone

$V = \frac{1}{3}\pi (4.3)^2 \cdot 11$ Replace r with 4.3 and h with 11.

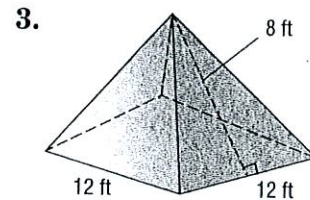
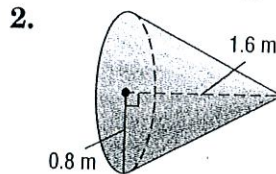
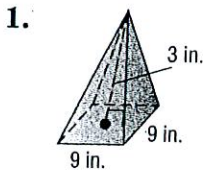
$V \approx 213.0 \text{ m}^3$ Simplify. Round to the nearest tenth.

The volume is about 213.0 m³.



Exercises

On a separate piece of paper, find the volume of each figure. Round to the nearest tenth. Be sure to give the formula, steps, and answer. $\pi = 3.14$



4. Square pyramid: length 1.2 centimeters, height 5 centimeters

5. Cone: diameter 4 yards, height 7 yards

6. Rectangular prism: length 14.5 meters, width 5.2 meters, height 6.1 meters

12-4 Study Guide and Intervention

(continued)

Volume of Pyramids, Cones, and Spheres

Volume of a Sphere To find the volume V of a sphere, use the formula $V = \frac{4}{3}\pi r^3$, where r is the radius.

Example 1 Find the volume of the sphere. Round to the nearest tenth.

$V = \frac{4}{3}\pi r^3$ Volume of a sphere

$V = \frac{4}{3}\pi(5)^3$ Replace r with 5.

$V \approx 523.6 \text{ in}^3$ Simplify.



The volume is about 523.6 in^3 .

Example 2 **SOCCER** A giant soccer ball has a diameter of 40 inches.

Find the volume of the soccer ball. Then find how long it will take the ball to deflate if it leaks at a rate of 100 cubic inches per hour.



Understand You know the diameter of the soccer ball.
You know the rate at which it is losing air.

Plan Find the volume of the ball.
Find how long it will take to deflate.

Solve $V = \frac{4}{3}\pi r^3$ Volume of a sphere
 $= \frac{4}{3}\pi \cdot 20^3$ Since $d = 40$, replace r with 20.
 $\approx 33,493.3 \text{ in}^3$ Simplify.

Use a proportion.

$$\frac{100 \text{ in}^3}{1 \text{ hour}} = \frac{33,493.3 \text{ in}^3}{x \text{ hour}}$$

$$100x = 33,493.3$$

$$x \approx 334.9$$

So, it will take approximately 335 hours for the ball to deflate.

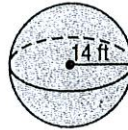
Exercises

On a separate piece of paper, find the volume of each sphere. Round to the nearest tenth. Be sure to give the formula, steps, and answer. $\pi = 3.14$

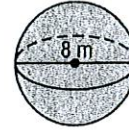
1.



2.



3.



4. Sphere: radius 5.2 miles

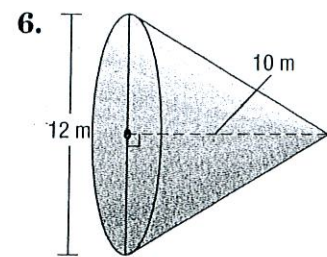
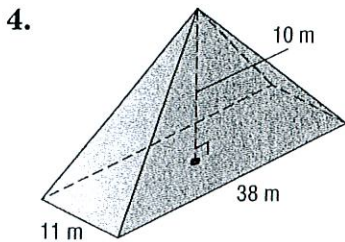
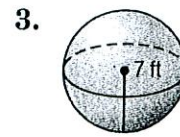
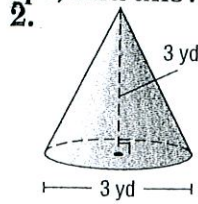
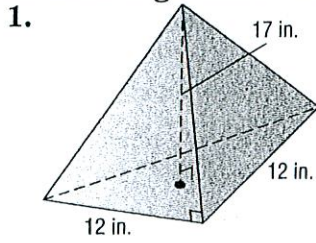
5. Sphere: diameter 11.6 feet

12-4 Practice

A calculator is allowed ☺

Volume of Pyramids, Cones, and Spheres

On a separate piece of paper, find the volume of each figure. Round to the nearest tenth. Be sure to give the formula, steps, and answer. $\pi = 3.14$



7. Find the volume of a rectangular pyramid with a length of 14 feet, a width of 12 feet, and a height of 9 feet.

8. Find the radius of a sphere with a volume of $972\pi \text{ cm}^3$.

9. Find the height of a cone with a radius of 12 in. and a volume of $408\pi \text{ in}^3$.

10. **CONTAINERS** A cone with a diameter of 3 inches has a height of 4 inches. A 2-inch square pyramid is being designed to hold nearly the same amount of ice cream. What will be the height of the square pyramid? Round to the nearest tenth.

12-4 Word Problem Practice

A calculator is allowed ☺

Volume of Pyramids, Cones, and Spheres

$$\pi = 3.14$$

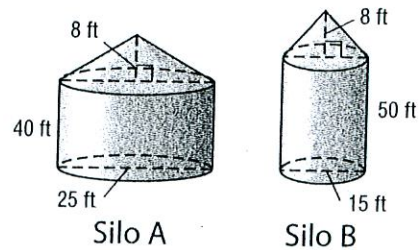
1. ARCHITECTURE Although the Eiffel Tower in Paris is not a solid pyramid, its shape approximates that of a pyramid with a square base measuring 120 feet on a side and a height of 980 feet. If it were a solid pyramid, what would be the Eiffel Tower's volume, in cubic feet?

2. WEATHER After a snow storm, you and a friend decide to build a snowman. You use three spheres of snow to build the snowman. The bottom sphere has a diameter of 4 feet, the middle has a diameter of 2 feet, and the head has a diameter of 18 inches. What is the volume of the snowman? Round your answer to the nearest cubic foot.

3. ICE CREAM A spherical scoop of ice cream is placed on a waffle cone. The diameter of the ice cream scoop is 6.4 centimeters. The waffle cone has a diameter of 5 centimeters and a height of 9 centimeters. If all the ice cream melts before you eat any, how much of the melted ice cream will overflow the waffle cone? Round your answer to the nearest tenth.

4. HISTORY The Great Pyramid of Khufu in Egypt has a square base measuring 756 feet on a side and a height of 481 feet. The stones used to build the Great Pyramid were limestone blocks with an average volume of 40 cubic feet. How many of these blocks were needed to construct the Great Pyramid? Round your answer to the nearest whole number.

5. FARMING Mr. Mills has just finished his corn harvest. He filled 12 trucks with corn and needs to move the corn to one of the two silos on his farm. Each truck bed is shaped like a rectangular prism having dimensions 10 feet wide, 20 feet long, and 6 feet tall. Mr. Mills needs to fit all the corn in the same silo.



a. How much corn has Mr. Mills harvested?

b. How much corn will each silo hold? Round your answer to the nearest whole number.

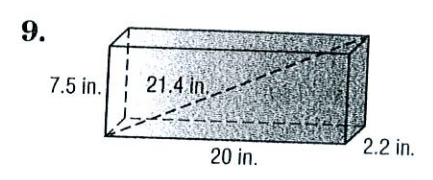
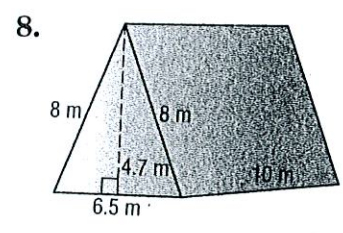
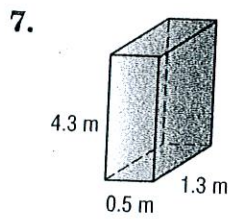
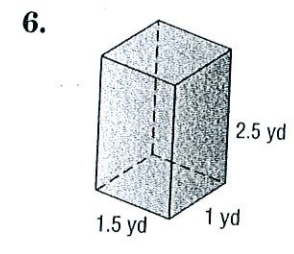
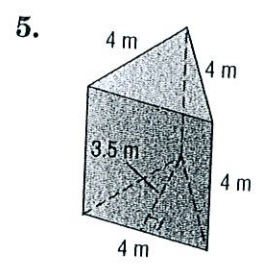
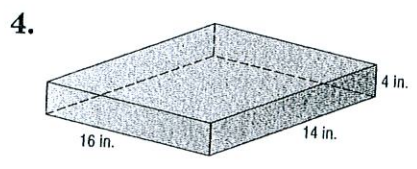
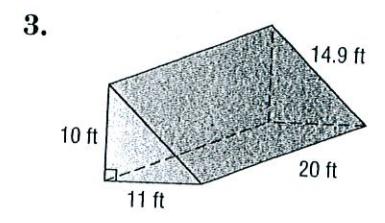
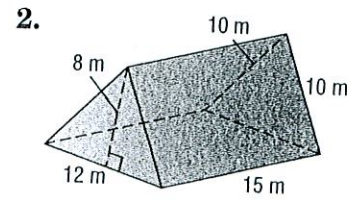
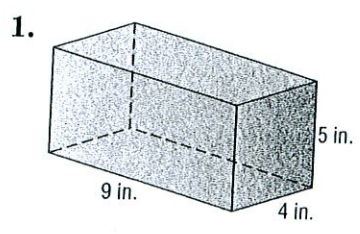
c. Which silo should Mr. Mills put all of his corn in? How many more full truckloads of corn could he store in the larger silo? Round your answer to the nearest whole number.

12-5 Skills Practice

A calculator is allowed 😊

Surface Area of Prisms

On a separate piece of paper, find the lateral area of each figure. Also, find the surface area! Round to the nearest tenth. Be sure to give the formula, steps, and answer.



10. Rectangular prism: length 17 yards, width 4.5 yards, height 3 yards
11. Rectangular prism: length 16 feet, width 12 feet, height 42 feet
12. Rectangular prism: length 20.2 centimeters, width 10 centimeters, height 43 centimeters

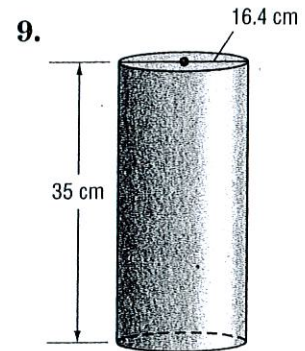
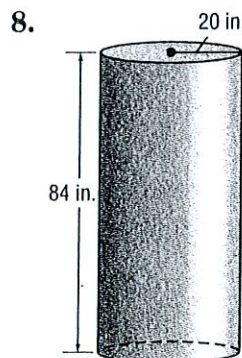
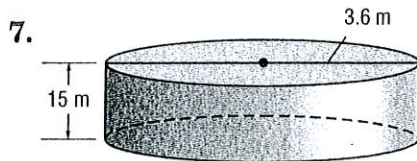
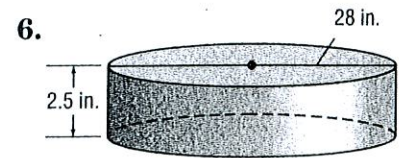
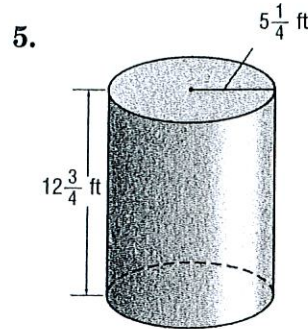
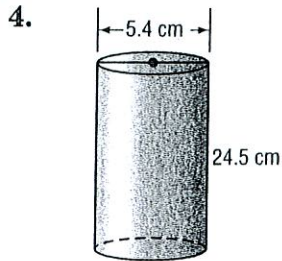
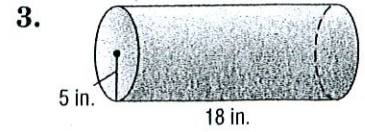
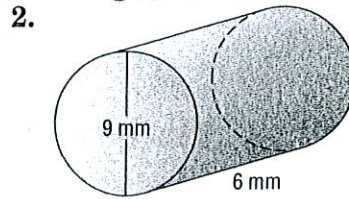
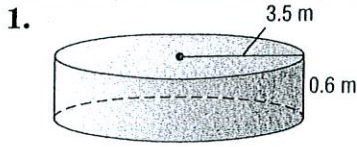
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12-6 Skills Practice

A calculator is allowed 😊

Surface Area of Cylinders

On a separate piece of paper, find the lateral area of each figure. Also, find the surface area! Round to the nearest tenth. Be sure to give the formula, steps, and answer. $\pi = 3.14$



10. Cylinder: radius 16 feet, height 42 feet

11. Cylinder: diameter 20.2 centimeters, height 43 centimeters

12. Cylinder: diameter 38.2 meters, height 50 meters

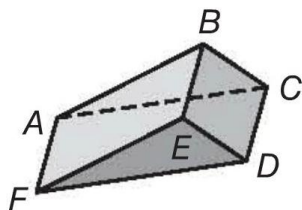
Name _____ Date _____ Pd _____

Chapter 12 Bringing It All Together

(Three-Dimensional Figures, Volume, & Surface Area)

Fill in the spaces provided to identify the figure as well as name the bases, faces, edges, and vertices.

1) **Figure:** _____



Bases: _____

Faces: _____

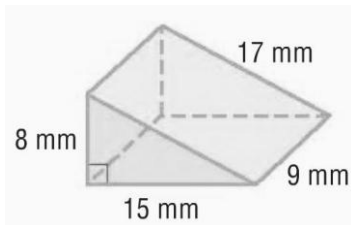
Edges: _____

Vertices: _____

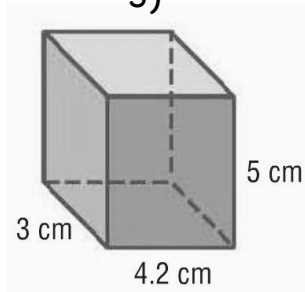
Using the space provided, find the volume of each figure.

Round to the nearest tenth. Show your formula and work. $\pi = 3.14$

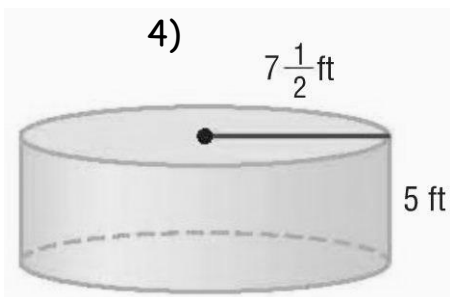
2)



3)



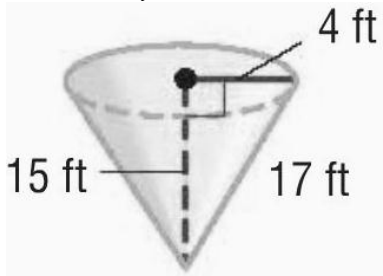
4)



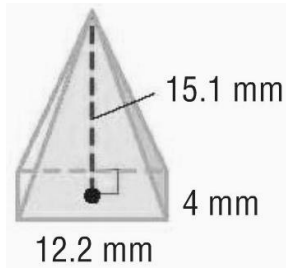
Name _____ Date _____ Pd _____

Using the space provided, find the volume of each figure.
Round to the nearest tenth. Show your formula and work. $\pi = 3.14$

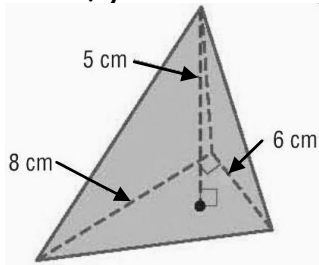
5)



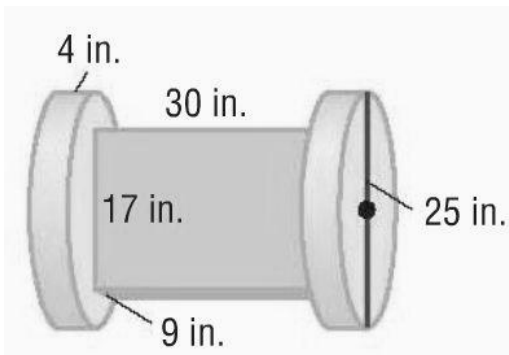
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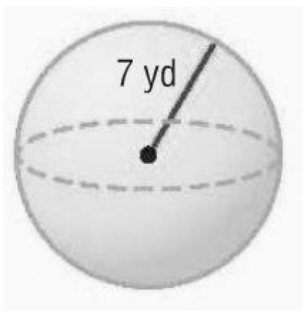
7)



8)



9)

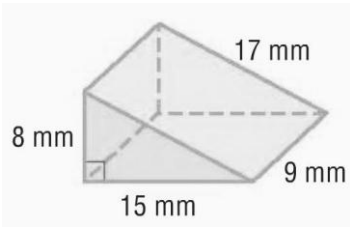


OVER →

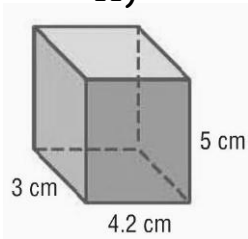
Name _____ Date _____ Pd _____

Using the space provided, find the lateral area & surface area of each figure. Round to the nearest tenth. Show your formula and work. $\pi = 3.14$

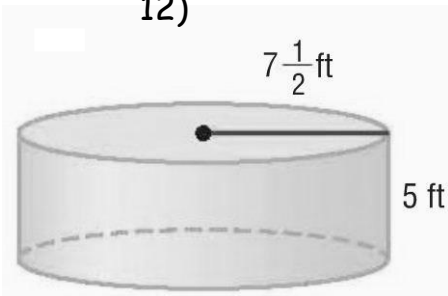
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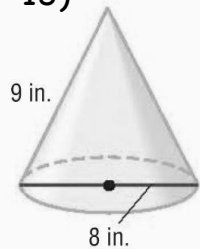
11)



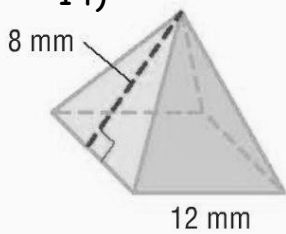
12)



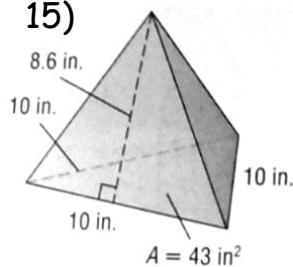
13)



14)



15)

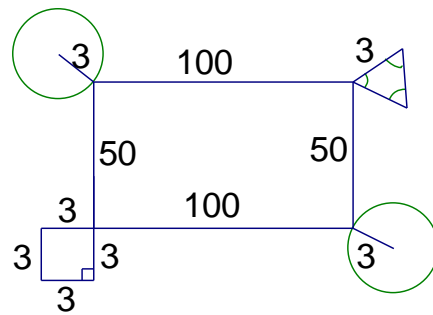
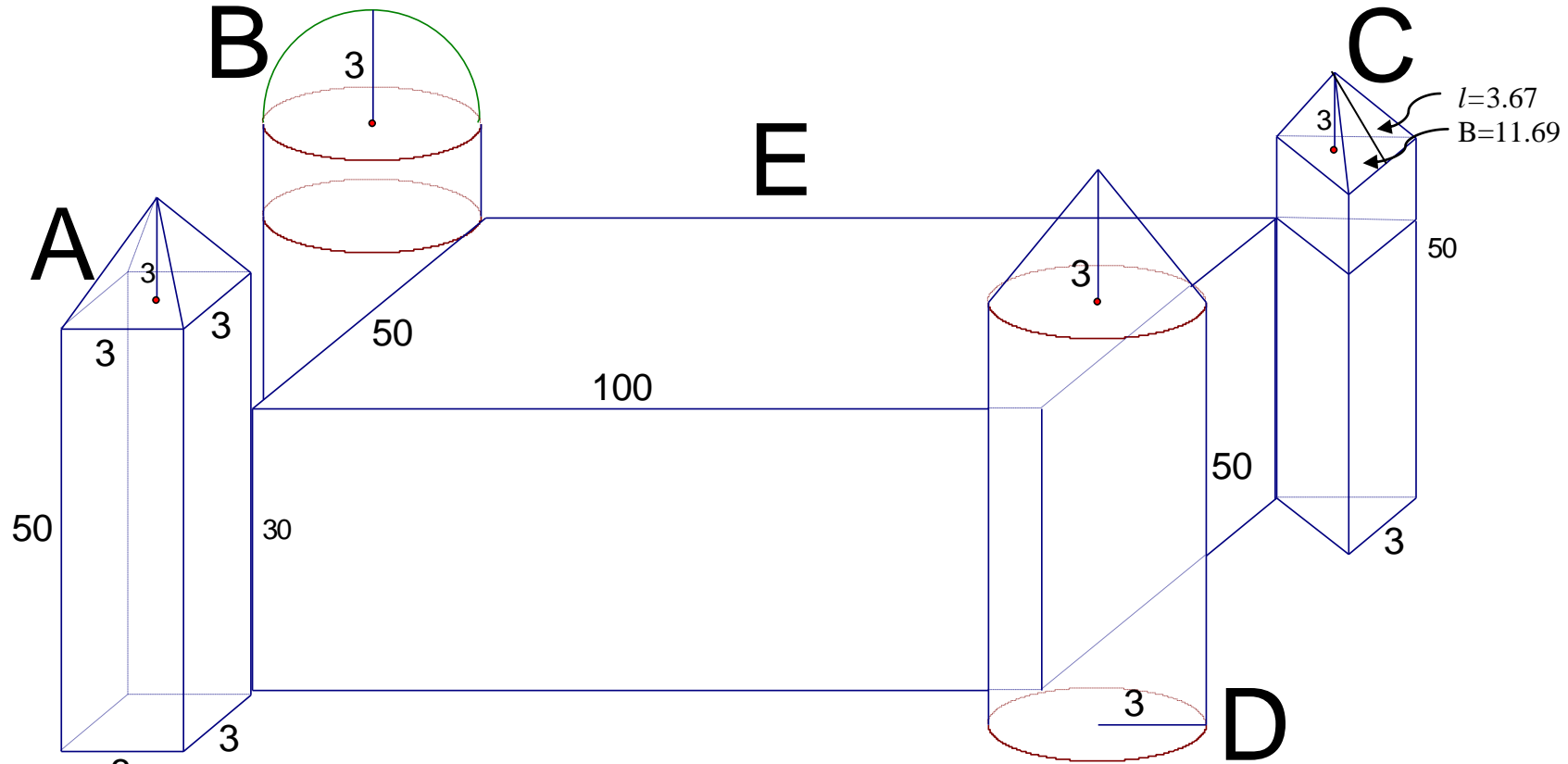


**FINALLY
DONE**



King Pi Thagoras is renovating his castle for a big medieval party. He hires you to figure out the surface area of his castle so that he can paint it, and the volume so he knows how much air space he has available. On another piece of paper, calculate the volume and surface area of each part of the castle. Label the surface area and volume for each part and then put them together to find the surface area and volume of the whole castle. Please round answers to 2 decimal places. Clearly show your work. Label= yds.

Due 5/20/13



Overhead view

Castle Activity

$l=3.67$
 $B=11.69$