## <u>Unit 12 – Volume and Surface Area – Day 1 – Volume of Prisms</u>

Name the shape of the base of each of the following shapes, and then find the Volume of the following prisms.





**7.** Regular Hexagon with a height of 10ft, and an apothem of 6 ft



**8.** If the volume of the hexagonal prism is 8000 cm<sup>3</sup> and the height of the prism is 20 cm, what is the area of the base?

**9.** Find the volume of the rectangular prism in terms of *x*.

**10.** Given the volume of the prism is 376.047 in<sup>3</sup>, the front side of the box is 12.7 inches by 5.3 inches what is the height of the Prism?

**11.** Mrs. Rooker is loading medical supply boxes into a crate. Each medical supply box is 1.5 feet tall, 1 foot wide, and 2 feet deep. The crate is 9 feet high, 10 feet wide, and 10 feet deep. What is the maximum number of medical supply boxes can she pack in this crate?





## <u>Unit 12 – Volume and Surface Area – Day 2 – Volume of</u> <u>Cylinders</u>

Find the Volume of the following cylinders (round to the nearest hundreth when necessary) or leave your answers in terms of  $\pi$ .





**8.** Find the volume of a cylinder with a radius of 4 yards, and the height of 5 yards.

9. Which of the following cylinders has more volume? How much more?



**10.** A tanker truck can carry 3,000 *gallons* of fuel and is going to fill an empty cylindrical gas tank with a height of 4 *feet*. The operator doesn't know the radius of the tank and is unsure whether the tank will be able to hold all of the fuel. When the height of the fuel in the tank reaches 1 *foot*, the operator looks at the pumping gauge and determines that approximately 846 *gallons* of fuel were pumped into the tank. Based on this information will all 3,000 *gallons* of fuel fit in the tank? Explain.



- **a.** Yes, the tank can hold a total of 4,280 *gallons* of fuel.
- **b.** Yes, the tank can hold a total of 3,384 *gallons* of fuel.
- **c.** No, the tank can only hold a total of 2,538 *gallons* of fuel.
- **d.** No, the tank can only hold a total of 2,154 *gallons* of fuel.
- 11. You want to design a cylindrical container for oatmeal that has a volume of  $90 in^3$ . You also want the height of the container to be 3.5 times the radius. To the nearest tenth, what should the radius of the container be?

| <b>A.</b> 2.0 in <b>C.</b> 3.0 |
|--------------------------------|
|--------------------------------|

**B.** 2.9 in **D.** 3.1 in

### Unit 12 - Surface Area and Volume - Day 3 - Vol. of Pyramids

Find the Volume of the following pyramids (round to the nearest hundreth when necessary).



V: \_\_\_\_\_

V:\_\_\_\_\_



**9.** The start of the pyramid age begain with King Zoser's pyramid, built in the 27<sup>th</sup> century B.C. In its orginal state, it stood 62 meters high, which a rectangular base that measured 140 meters by 118 meters. Find the volume of the orginal pyramid.

**10.** A stage has the form of a square pyramid with the top sliced off along a plane parallel to the base. The side length of the top square is 12 feet and the side length of the bottom square is 16 feet. The height of the state is 3 feet. The height of the entire pyramid is 9 feet.

- **a.** What is the volume of the entire square pyramid that the stage is part of?
- **b.** What is the volume of the top of the pyramid that is removed to get the stage?
- c. What is the volume of the stage?



Find the Volume of the following cones (round to the nearest hundreth when necessary).





V: \_\_\_\_\_

V:\_\_\_\_\_

#### Find the height of the following cones. Round your answer to the nearest tenth.



**10.** Mr. Ganty build a conical storage shed. The base of the shed is 4 meters in diameter, and the height of the shed is 3.8 meters. What is the volume of the shed?

**11.** Caitlyn made a teepee for a class project. Her teepee had a diameter of 6 feet. The angle the side of the teepee made with the ground was 65 degrees. What is the volume of the teepee?



**12.** A food manufacturer sells yogurt in the cone shaped cups with the deimensions shown. To the nearest tenth, how many fluid ounces of yougurt does the cup hold?



## <u>Unit 12 – Volume and Surface Area – Volume Unit</u> <u>Review</u>

6.

#### Find the Volume of the following solids.











5.





- **9.** Jamal wants to fill a container with two different colors of sand for an art project. The container is 9 *inches* tall and has a regular polygon base. He is going to fill part of the container with  $10 in^3$  of blue sand. How much green sand does Jamal need to purchase to fill the rest of the container? Round your answer to the nearest tenth if necessary.
  - **A.** 36.8 *in*<sup>3</sup>
  - **B.**  $44 in^3$
  - **C.** 46.8  $in^3$
  - **D.** 54  $in^3$



10. Compare the volumes of the cone and the regular pyramid below. Which statement is true?





side length 12 inches

- **A.** The volume of the pyramid is about  $140 in^3$  more than the volume of the cone.
- **B.** The volume of the cone is about 279.8  $in^3$  more than the volume of the pyramid.
- **C.** The volume of the cone is about  $531.8 in^3$  more than the volume of the pyramid.
- **D.** The volume of the cone is about  $112 in^3$  more than the volume of the pyramid.

- **11.** What is the height of a square pyramid that has a side length of 13 *feet* and a volume of  $1521 ft^3$ ?
  - **A.** h = 3 feet **C.** h = 27 feet
  - **B.** h = 9 feet **D.** h = 39 feet
- **12.** As part of a contest, Shelly wants to estimate the number of dried beans in a cylindrical container with a diameter of 8 *inches* and a height of 12 *inches*. At home, she fills a smaller cylindrical container with a diameter of 2 *inches* and a height of 1 *inch* with beans. Shelly then counts and finds that it takes 108 beans to fill the smaller container. Based on this information, what would be Shelly's likely estimate for the number of beans in the larger container?
  - **A.** 82,604 beans
  - **B.** 20,736 beans
  - **C.** 10,368 beans
  - **D.** 5,184 beans
- **13.** You want to design a cylindrical container for oatmeal that has a volume of  $90 in^3$ . You also want the height of the container to be 3.5 times the radius. To the nearest tenth, what should the radius of the container be?

| A. | 2.0 in | С. | 3.0 in |
|----|--------|----|--------|
| в. | 2.9 in | D. | 3.1 in |

- **14.** A food manufacturer sells yogurt in cone shaped cups with the dimensions shown. To the nearest tenth, how many fluid ounces of yogurt does the cup hold if  $1 cm^3 \approx 0.034 \ fl \ oz$ ?
  - **A.** 0.6 *fl oz*
  - **B.** 5.7 *fl oz*
  - **C.** 17.1 *fl oz*
  - **D.** 22.8 *fl oz*



## Unit 12 - Surface Area and Volume - Day 5 - SA Prisms

#### <u>Name the shape of the base of each of the following shapes, and then find the</u> <u>Surface Area of the following prisms.</u>





SA: \_\_\_\_\_

SA: \_\_\_\_\_







## <u>Unit 12 – Surface Area and Volume – Day 6 – SA Cylinders</u>

# Find the Surface Area of the following cylinders (round to the nearest hundreth when necessary) or leave in terms of pi.





## Find the height of a cylinder with a given radius and the given surface area (round each decimal to the nearest hundredth).

**12.** r = 25cm and  $SA = 4867cm^2$ 

**14.** r = 4.5 ft and  $SA = 141.3 ft^2$ 

h: \_\_\_\_\_

h: \_\_\_\_\_

**15.** You are frosting a circular cake that has three layers. Each layer has a 5 inch diameter, and is 2 inches tall. You frost in between each layer and the exposed surface of the cake excluding the bottom. To the nearest square inch, what is the total area that you frost?

**16.** The sureface area of a cylinder is 408.2 square feet. The area of one of the bases is 78.5 square feet. Find the height of the cylinder (round to the nearest tenth).

**17.** The height and the radius of the cylinder are equal. The cylinder has a surface area of 113.04 square feet. Find the height of the cylinder (round to the nearest tenth).

### Unit 12 - Surface Area and Volume - Day 7 - SA Pyramids

Find the Surface Area of the following pyramids (round to the nearest hundreth when necessary). 1. 2. A 3. A









SA: \_\_\_\_\_

SA: \_\_\_\_\_ SA: \_\_\_\_



**9.** Daphne uses a paperweight shaped like a pyramid with a regular hexagon for a base. The side length of the regular is 1 inch. The altitude of the pyramid is 2 inches. What is the surface area of the pyramid (round your answers to the nearest hundredth)?

**10.** Patrick is making a paper model of a castle. Part of the model involves cutting out the net shown and folding it into a pyramid. The pyramid has a square base. What is the surface are of the resulting pyramid.



## Unit 12 - Surface Area and Volume - Day 8 - SA Cones

Find the Surface Area of the following cones (round to the nearest hundreth when necessary) or leave in terms of pi.



| SA: | SA: | SA: |
|-----|-----|-----|
|     |     |     |



**10.** Find the surface area of a cone with a height of 14 centimeters, and a slant height of 16.4 centimeters.

**11.** Find the sureface area of a cone if the height is 12 inches and the diameter is 27 inches.

## <u>Unit 12 – Surface Area and Surface Area – Surface Area</u> <u>Review</u>

#### Name the following bases for each solid.









#### Find the Surface Area of the following solids (round to the nearest hundredth).





For 16 – 18, write SA in terms of "x"









side length 12 inches

The Surface Area of the cone is about  $93.88 in^2$  more than the Surface Area of the **A**. pyramid.

The Surface Area of the cone is about  $105.62 in^2$  more than the Surface Area of the **B.** pyramid.

The Surface Area of the cone is about  $200.62 in^2$  more than the Surface Area of the **C.** pyramid.

The Surface Area of the cone is about 204.52  $in^2$  more than the Surface Area of the **D.** pyramid.

## <u>Unit 12 – Surface Area and Volume – Day 9 – SA & V of</u> <u>Spheres</u>

Find the surface area of each sphere or hemisphere (round to the nearest tenth when necessary) or leave in terms fo pi.



**5.** Find the surface area of a sphere with a circumference with a great circle of  $\pi$  inches.

**6.** Find the surface area of a hemisphere with an area of the great circle of  $4\pi in^2$ .

# Find the Volume of each sphere or hemisphere (round to the nearest tenth when necessary).



**10.** Find the volume of a hemisphere with a radius of 5 inches.

**11.** Find the volume of a sphere with a circumference of the great circle of 25 feet.

**12.** Find the volume of a hemisphere that has an area of a great circle of 50m<sup>2</sup>.

**13.** Mandy cuts a sphereical orange in half along a great circle. If the radius of the orange is 2 inches, what is the area of the cross section that Mandy cut? Round your answer to the nearest hundredth.

**14.** A billiards ball set consits of 16 spheres, each 2.25 inches in diameter. What is the total volume of a complete set of billiard balls? Round your answer to the nearest thousandth of a cubic inch.

## <u>Unit 12 – Surface Area and Volume – Day 10 – Surface Area</u> <u>and Volume of Composite Figures</u>

#### Find the Volume of the following Composite Solids.







V = \_\_\_\_\_

V = \_\_\_\_\_

For 5 - 7, find the volume on the following solids.





7.





#### 8.

A group of professional snowboarders are designing their ideal terrain park. Here is their design for a 'half pipe' (not drawn to scale).



 Find the area of the surface of the halfpipe that needs to be covered by snow (i.e. the total area of the two decks and the surface in between). Write your answer to the nearest m<sup>2</sup>.

#### Area needed of Snow: \_\_\_\_\_

## **Unit 12 – Surface Area and Volume – UNIT REVIEW**

#### Find the S, surface area and V, volume of each solid.







#### Leave the following in terms of the variable



#### Leave the following in terms of the variable









- 18. What is the closest approximation of the volume of the figure below?
  - A.  $734 \ cm^3$
  - **B.** 998  $cm^3$
  - **C.** 1090 *cm*<sup>3</sup>
  - **D.** 1166 *cm*<sup>3</sup>



**17.** S =\_\_\_\_

V =

- **19.** A box in the shape of a square prism has three golf balls inside. Each golf ball has a radius of 0.84 inches. What is the minimum volume of the box needed to hold the golf balls?
  - **A.**  $4.74 in^2$
  - **B.** 7.44  $in^2$
  - C. 14.22  $in^2$
  - **D.** 19.86  $in^2$

