

Surface Area and Volume

Name _____

If aluminum costs \$.01 per square inch figure the Total Surface Area (TSA) to find the cost of making the container assuming the cylinder is closed with a lid. Then figure the Volume of the container. Compare the Total Surface Area Cost to Volume in ratio form.

Formulas

$$\text{Circumference (C)} = \pi d$$

$$\text{Area (A)} = \pi r^2$$

$$\text{Lateral Surface Area (LSA)} = C \times \text{height}$$

$$\text{Volume (V)} = A \times \text{height}$$

Measure the cylinders given as examples in class for problems #1 and #2. Show dimensions in inches on the diagrams. Write answers in decimal form rounded to three decimal places.

1.



$$C =$$

$$A =$$

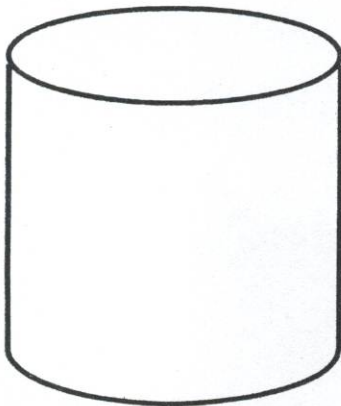
$$\text{LSA} =$$

$$\text{TSA} =$$

$$V =$$

$$\frac{\text{TSA Cost}}{V} =$$

2.



$$C =$$

$$A =$$

$$\text{LSA} =$$

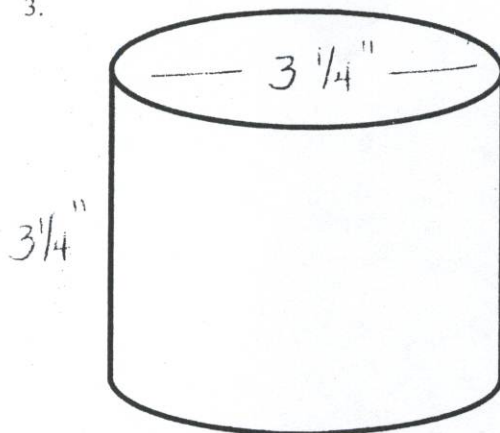
$$\text{TSA} =$$

$$V =$$

$$\frac{\text{TSA Cost}}{V} =$$

Now figure a cylinder with the diameter extended to be the same length as the height of the cylinder.

3.



C =

A =

LSA =

TSA =

V =

$\frac{\text{TSA Cost}}{V} =$

4. Which container is the most efficient regarding cost compared to volume? Why?
5. What do you notice about the volumes of the containers in relation to their diameters?
6. When comparing the height of a cylinder to the diameter of the cylinder what is necessary to give the greatest volume at the least expense?
7. If you were to increase the diameter even more and decrease the height of the cylinder would your total surface area and volume increase or decrease? How did you figure this out?

Lesson Extension:

Look at the Coca-Cola can. Draw a diagram and show the measurements of the can in inches. Figure the circumference, area, lateral surface area, total surface area, and volume of the can. Figure the Total Surface Area to Volume based upon \$.01 per square inch of aluminum.

Is this the most efficient container that the Coca-Cola Company could sell their soda in? Why do you think they chose the size of container they do package their product in?