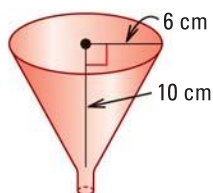




Lessons 12.4–12.7

1. **MULTI-STEP PROBLEM** You have a container in the shape of a right rectangular prism with inside dimensions of length 24 inches, width 16 inches, and height 20 inches.
 - a. Find the volume of the inside of the container.
 - b. You are going to fill the container with boxes of cookies that are congruent right rectangular prisms. Each box has length 8 inches, width 2 inches, and height 3 inches. Find the volume of one box of cookies.
 - c. How many boxes of cookies will fit inside the cardboard container?
2. **SHORT RESPONSE** You have a cup in the shape of a cylinder with inside dimensions of diameter 2.5 inches and height 7 inches.
 - a. Find the volume of the inside of the cup.
 - b. You have an 18 ounce bottle of orange juice that you want to pour into the cup. Will all of the juice fit? *Explain* your reasoning. ($1 \text{ in.}^3 \approx 0.554 \text{ fluid ounces}$)
3. **EXTENDED RESPONSE** You have a funnel with the dimensions shown.



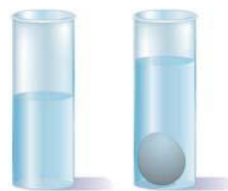
- a. Find the approximate volume of the funnel.
- b. You are going to use the funnel to put oil in a car. Oil flows out of the funnel at a rate of 45 milliliters per second. How long will it take to empty the funnel when it is full of oil? ($1 \text{ mL} = 1 \text{ cm}^3$)
- c. How long would it take to empty a funnel with radius 10 cm and height 6 cm?
- d. *Explain* why you can claim that the time calculated in part (c) is greater than the time calculated in part (b) without doing any calculations.

4. **EXTENDED RESPONSE** An official men's basketball has circumference 29.5 inches. An official women's basketball has circumference 28.5 inches.

- a. Find the surface area and volume of the men's basketball.
- b. Find the surface area and volume of the women's basketball using the formulas for surface area and volume of a sphere.
- c. Use your answers in part (a) and the Similar Solids Theorem to find the surface area and volume of the women's basketball. Do your results match your answers in part (b)?



5. **GRIDDED ANSWER** To accurately measure the radius of a spherical rock, you place the rock into a cylindrical glass containing water. When you do so, the water level rises $\frac{9}{64}$ inch. The radius of the glass is 2 inches. What is the radius of the rock?



6. **SHORT RESPONSE** Sketch a rectangular prism and label its dimensions. Change the dimensions of the prism so that its surface area increases and its volume decreases.
7. **SHORT RESPONSE** A hemisphere and a right cone have the same radius and the height of the cone is equal to the radius. *Compare* the volumes of the solids.
8. **SHORT RESPONSE** *Explain* why the height of a right cone is always less than its slant height. Include a diagram in your answer.