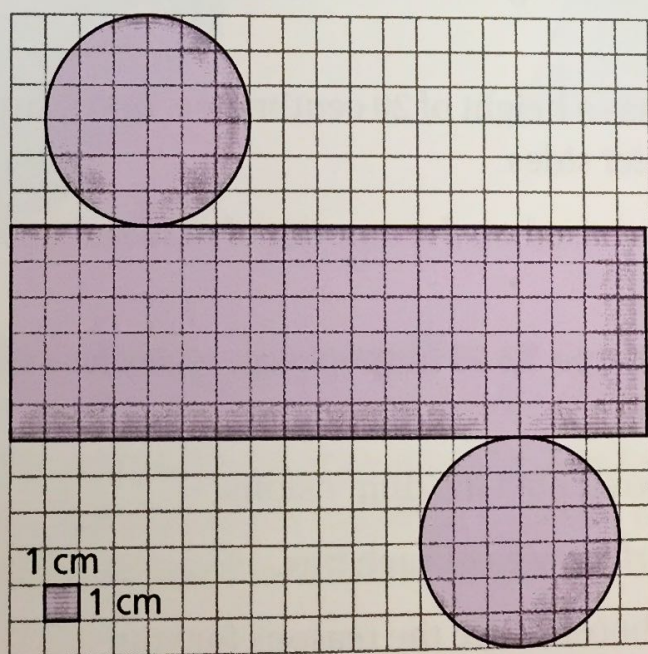


3. A cylinder has a radius of 3 centimeters. Sand is poured into the cylinder to form a layer 1 centimeter deep.
  - a. What is the volume of sand in the cylinder?
  - b. Suppose the height of the cylinder is 20 centimeters. How many 1-centimeter deep layers of sand are needed to fill the cylinder?
  - c. What is the volume of the cylinder?

For Exercises 4 and 5, find the surface area and volume of each cylinder.

4. height = 10 cm, radius = 6.5 cm
5. height = 6.5 cm, radius = 10 cm
6. A pipeline carrying oil is 5,000 kilometers long and has an inside diameter of 2 meters. (Remember: 1 km = 1,000 m.)
  - a. How many cubic meters of oil will it take to fill 1 kilometer of the pipeline?
  - b. How many cubic meters of oil will it take to fill the entire pipeline?
7. Below is a scale model of a net for a cylinder.



- a. Suppose the net is assembled. Find the volume of the cylinder.
- b. Find the surface area of the cylinder.

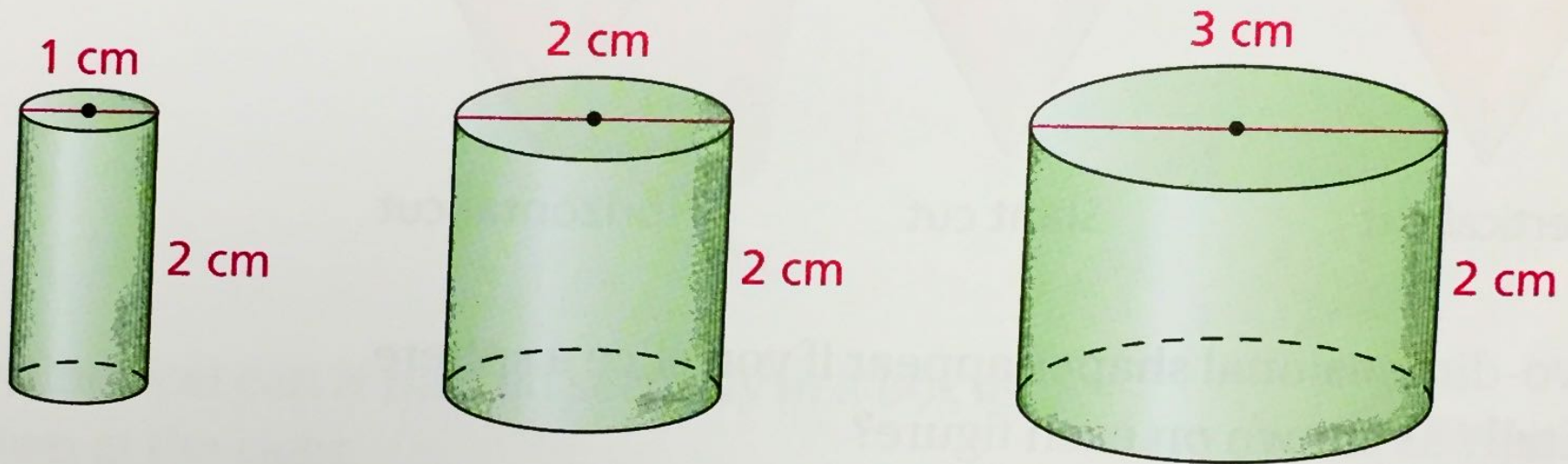
29. Suppose that you are shown two packages for sugar.



- Which package has the greater surface area? How do you know?
- Which package has the greater volume? How do you know?



36. a. Make a table showing the relationship between the diameter and the circumference of a circle. Include data for diameters 1, 2, 3, . . . , 10 cm.
- b. Make a graph of the data (*diameter, circumference*) in your table.
- c. Suppose that each of the circles represented in your table is the base of a cylinder with height 2 cm. Some of these cylinders are shown below. Add a column to your table to show the relationship between the diameter of the base and the volume of the cylinder.



- d. Make a graph of the data (*diameter, volume*).
- e. Compare the graphs for part (b) and part (d). How are they alike? How are they different?