

Tennis Can Geometry

Materials Needed: A can of tennis balls for each group of three students, measuring tapes or string and a ruler

Teacher's Note: Depending on the level of the students, you may want to just tell the students the diameter of the tennis ball or have them use the measuring tape or string and ruler to determine the circumference of the tennis ball which, in turn, should allow the students to calculate the radius of the tennis ball. If you calculate the radius the later way, you may also want to NOT give the students the can that the tennis balls came in until they calculate the radius of the tennis ball to prevent them from taking "short-cuts." The can could then be used to check to see how accurately they calculated the radius. Have them compare the diameter of the tennis ball to the diameter of the can. This preliminary activity should help students to better begin answering the questions below.

1. a. Determine the height of the tennis ball can. _____
 - b. Determine the circumference of the can. _____
 - c. Compare the two. _____
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Show work below.

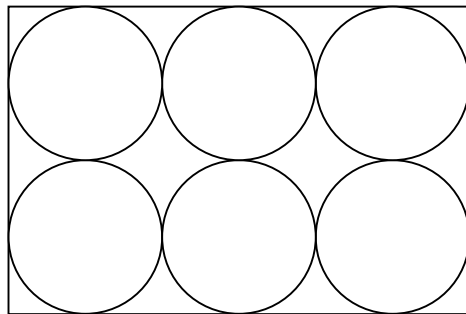
2. a. Determine the volume of the can. _____
- b. Determine the volume of a tennis ball. _____
- c. Determine the total volume of all of the tennis balls in the can. _____
- d. What **percentage** of the volume of the can do the balls occupy? _____

Show work below.

3. a. Determine the lateral surface area of the can. _____
- b. Determine the total surface area of the can. _____
- c. How does the lateral surface area compare to the total surface area of the can? _____

Show work below.

4. a. Using the diagram below of the top view of a box packed with tennis ball cans, determine the **percentage** of the box that is filled with the cans. _____
- b. What **percentage** of the box is NOT filled with cans? _____
- c. Why should the manufacturer be concerned with the percentage of the box that is NOT filled?

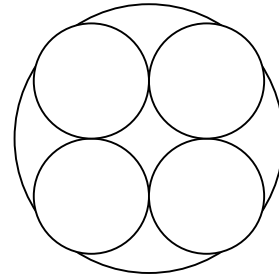
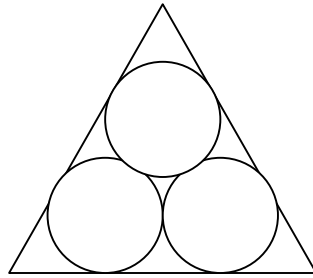
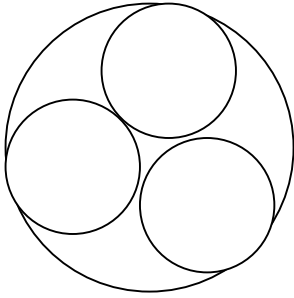


5. a. Suppose cans are packed in containers that are either circular or triangular (refer below to the top views of the containers), determine the percentage of wasted space in each container.

Container 1: _____

Container 2: _____

Container 3: _____



- b. Which container is the most efficient in terms of wasted space? _____

Explain. _____

Show work below.