

Volume Exploration

M316L - Fall 2009

Suppose that you work for a snack food company. Your job at this company is to design packaging for the various types of snacks that your company makes. Recently, there has been interest in new, larger package sizes, and you have been assigned the task of finding new designs.

Part 1: Volume of a Box

A popular type of snack cracker currently comes in a box with the following dimensions:

$$20 \text{ cm} \times 12 \text{ cm} \times 5 \text{ cm}.$$

The new box is supposed to hold three times as many crackers as the original box. Suppose the cardboard used to make the box costs \$0.005 per square centimeter. When designing a new box, there are several factors to consider:

- Is the size requirement met? (i.e., Is the volume correct?)
- Is the design cost-effective? (i.e., Is the surface area too big?)
- Is the box practical? (i.e., Will it fit well on a store shelf?)

With these things in mind, find a “good design” for the new box.

Part 2: Volume of a Cylinder

A popular type of candy currently comes in a cylindrical container with the following dimensions:

$$15 \text{ cm tall, } 6 \text{ cm in diameter}.$$

The new container is supposed to hold twice as much candy as the original container. Suppose the material used to make the container costs \$0.008 per square centimeter. When designing a new container, there are several factors to consider:

- Is the size requirement met? (i.e., Is the volume correct?)
- Is the design cost-effective? (i.e., Is the surface area too big?)
- Is the container practical? (i.e., Will it fit well on a store shelf?)

With these things in mind, find a “good design” for the new container.