Bursting Bubbles Beverage Company

The Bursting Bubbles beverage company packages their carbonated water in 350 milliliter cylindrical cans that have a height of 15 centimeters. They want to change their packaging so that the can still holds 350 milliliters of water, but the radius and the height of the can are different from the original cans. Remember that 1,000 milliliters = 1 liter and 1 milliliter = 1 cubic centimeter.

Here you will use the HP 39gs to explore the various package designs for the cylindrical cans as well as what happens with cans of other shapes.

Exercise 1

You will begin your investigation by determining the radius of a can when the volume is 350 mL and the height of the can is 15 cm.
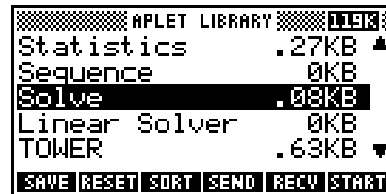
Press the APLET key and choose **Solve** (Figure 1).

Figure 1

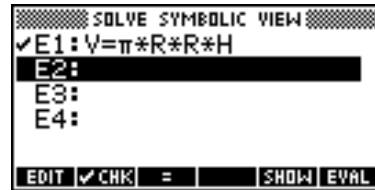This HP Aplet starts in its symbolic view. Enter your formula for the volume of the can in *E*1 (Figure 2).

Figure 2

Press the NUM key to see the numeric view of the Solve Aplet. Highlight *V* and enter 350, highlight *H* and enter 15, and then highlight *R* and press the SOLVE menu key. (Figure 3)
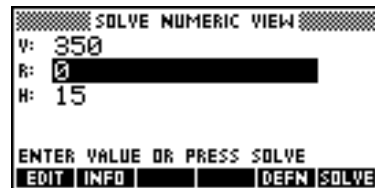
Figure 3

a. What is the value of *R*?

b. What does *R* represent in terms of the can?

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Version 1.0

Exercise 2
When you change the value of R, what happens to H so that the volume remains 350 milliliters? Enter several values for R, some that are larger than your answer in Exercise 1 and some that are smaller. Each time, highlight H and press the SOLVE menu key.

Record your answers in the table.

Radius	Height

Exercise 3
The Bursting Bubbles beverage company is intrigued by the idea of a can whose height is equal in length to the diameter of its base. Such a can could just fit into a gift box shaped like a cube! Find the dimensions of such a can that still has a volume of 350 milliliters.

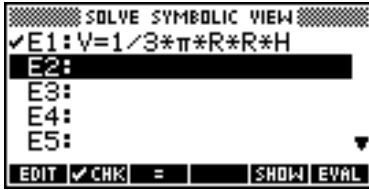a. What is the relationship between diameter and height?

b. What is the relationship between height and radius?

c. What H and R values give a volume of 350 milliliters (within 1 ml)? Keep track of your guesses in the table below.

Radius	Height	Volume

Exercise 4

The Bursting Bubbles beverage company wants to explore cans of different shapes. Input the formula for the volume of a cone as shown below.

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▒▒▒▒▒ SOLVE SYMBOLIC VIEW ▒▒▒▒▒
✓E1:V=1/3*π*R*R*H
 E2:
 E3:
 E4:
 E5:                         ▼
EDIT ✓CHK  =     SHOW EVAL
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The company still wants to have the volume be 350 milliliters. Rather than enter 350 for *V* as you did in Exercises 1 and 2, you should now experiment with different values for the height and radius and solve for *V*. Keep track of your dimensions in the table below until you get a volume that is within 1 milliliter of 350 milliliters.

Radius	Height	Volume

What values for height and radius did you find that made a volume of 350 milliliters (within 1 ml)?

Exercise 5

The volume for a sphere is given by the formula $V = \frac{4}{3}\pi r^3$.

Use this formula in the Solve Aplet to find the value of the radius that makes the volume 350 milliliters, accurate to 1 milliliter.