Experiment 1.2: Determining the Relationship Between Cubic Centimeters and Milliliters

Data:

Height of the pill bottle: 10.25 cm
Diameter of the pill bottle: 2.63 cm
Number of complete graduated cylinders dumped into the sink: 1
Volume of the water in the final graduated cylinder: 6.0 mL

Calculations:

Radius of the pill bottle: 2.63 cm ÷ 2 = 1.32 cm
Volume of the pill bottle: $V = \pi r^2 h = (3.14) \cdot (1.32 \text{ cm})^2 \cdot (10.25 \text{ cm}) = 56.1 \text{ cm}^3$
Volume of water in the pill bottle: 6.0 mL + 50.0 mL = 56.0 mL

Summary:

In this experiment, I measured the height and diameter of a pill bottle in centimeters. I used those measurements to calculate the volume of the pill bottle in cm^3. Then, I filled the pill bottle completely full with water, even allowing some to spill out so I was sure it was completely full. I carefully poured water from the pill bottle into a graduated cylinder, which allowed me to measure the volume of the water in milliliters. The volume of the water in milliliters (56.0 mL) was consistent with the volume of the pill bottle in cm^3 (56.1 cm^3), because there is always some error in the last significant figure. This is as expected, because milliliters and cm^3 are equivalent measurements of volume.

(**Please note**: If your two volumes are not consistent with one another, you need to speculate as to why. You could say, "The measurements should have been consistent with one another, but they are not. It's possible that I spilled water when transferring it from the pill bottle to the graduated cylinder. It's also possible that some water clung to the sides of the pill bottle when I let it overflow, and then that water fell into the graduated cylinder as I poured.")