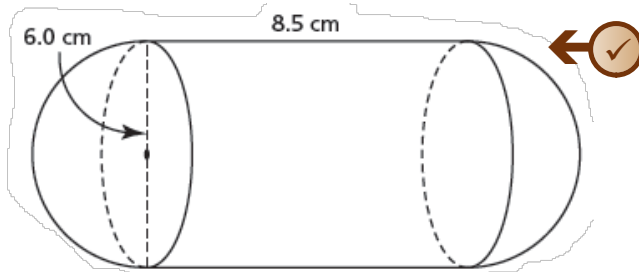


5. Determine the surface area and volume of each composite object.

Write the answers to the nearest tenth of a unit.

a) right cylinder and hemispheres



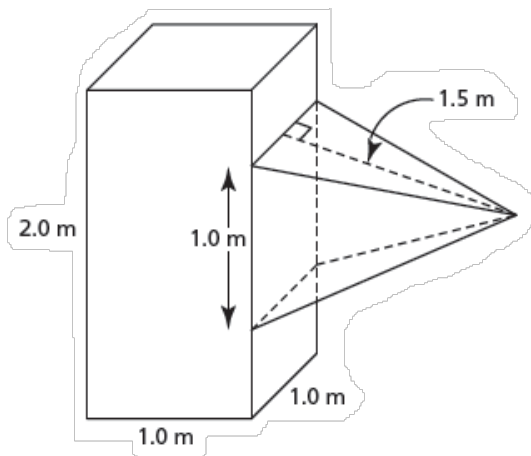
$$\begin{aligned}
 \text{S.A.} &= 4\pi r^2 + 2\pi rh \\
 &= 4\pi(3)^2 + 2\pi(3)(8.5) \\
 &= 36\pi + 51\pi \\
 &= 87\pi \\
 &= 273.3\text{ cm}^2
 \end{aligned}$$

5. a) $273.3\text{ cm}^2, 353.4\text{ cm}^3$ b) $12.0\text{ m}^2, 2.5\text{ m}^3$

$$\begin{aligned}
 V &= \pi r^2 h + \frac{4}{3}\pi r^3 \\
 &= \pi(3)^2(8.5) + \frac{4}{3}\pi(3)^3 \\
 &= 76.5\pi + 36\pi \\
 &= 112.5\pi \\
 &= 353.4\text{ cm}^3
 \end{aligned}$$

1.7 Solving Problems Involving Objects

b) right square prism and right square pyramid



$$\begin{aligned}
 S.A. &= 4 \text{triangles} + \text{box} \cdot \text{overlap} \\
 &= 4 \frac{bh}{2} + 2lw + 2lh + 2wh - lw \\
 &= \frac{4(1.0)(1.5)}{2} + 2(1.0)(1.0) + 2(1.0)(2.0) \\
 &\quad + 2(1.0)(2.0) - (1.0)(1.0) \\
 &= 3 + 2 + 4 + 4 - 1 \\
 &= 12 \text{ m}^2
 \end{aligned}$$

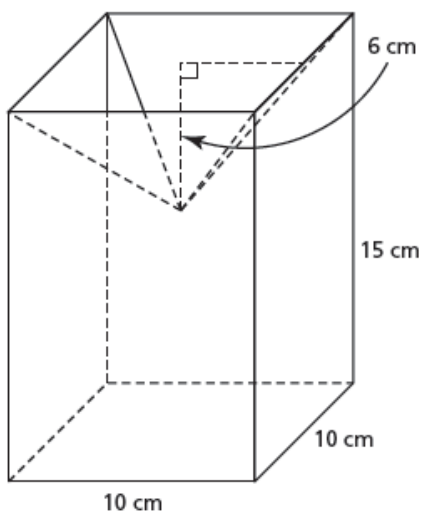
$$\begin{aligned}
 V_T &= V_{\text{pyramid}} + V_{\text{prism}} \\
 &= \frac{A_{\text{base}} \times \text{height}}{3} + A_{\text{base}} \times \text{height} \\
 &= \frac{(1.0)(1.0)(\sqrt{2})}{3} + (1.0)(1.0)(2.0) \\
 &= \frac{\sqrt{2} + 2}{3} \\
 &= 2.47 \text{ m}^3
 \end{aligned}$$

Altitude

$$\begin{aligned}
 x^2 &= 1.5^2 - 0.5^2 \\
 x &= \sqrt{2}
 \end{aligned}$$

Determine the volume of each object to the nearest tenth of a cubic unit.

- a) a right square prism with a right square pyramid removed



10. a) 1300.0 cm^3

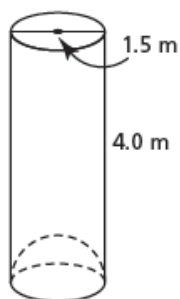
b) 6.2 m^3



$$\begin{aligned}
 V &= V_{\text{prism}} - V_{\text{pyramid}} \\
 &= lwh - \frac{lwh}{3} \\
 &= (10)(10)(15) - \frac{(10)(10)(6)}{3} \\
 &= 1500 - 200 \\
 &= 1300 \text{ cm}^3
 \end{aligned}$$

1.7 Solving Problems Involving Objects

b) a right cylinder with
a hemisphere removed

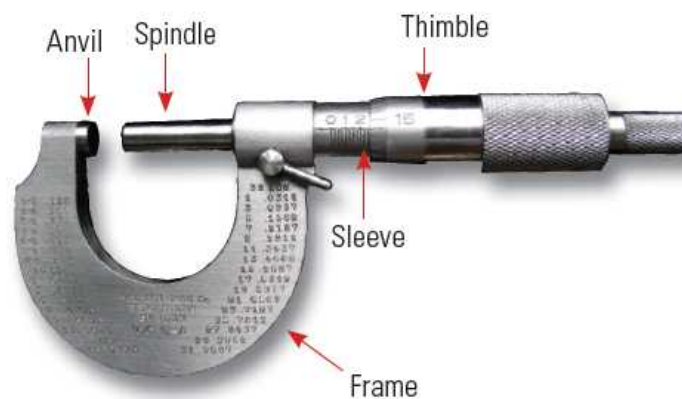


$$\begin{aligned}
 V &= V_{\text{cylinder}} - V_{\text{hemisphere}} \\
 &= \pi r^2 h - \frac{1}{2} \left(\frac{4\pi r^3}{3} \right) \\
 &= \pi \left(\frac{1.5}{2} \right)^2 (4.0) - \frac{2\pi \left(\frac{1.5}{2} \right)^3}{3} \\
 &= 2.25\pi - 0.28125\pi \\
 &= 1.96875\pi \\
 &= 6.19 \text{ m}^3
 \end{aligned}$$

ACTIVITY 6.6 USING MICROMETERS AND CALIPERS

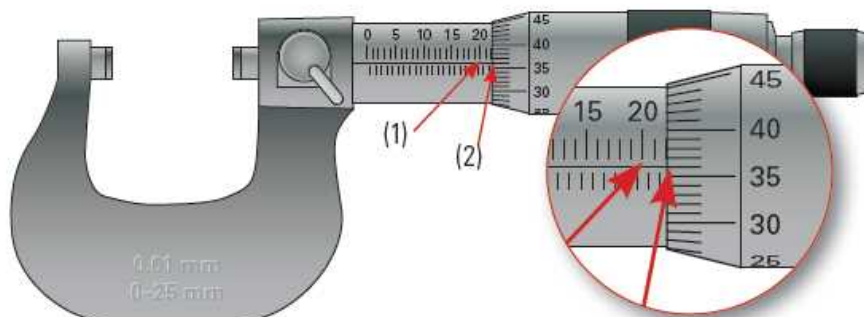
Some common measurement tools used to measure lengths are a ruler and a tape measure. When measuring the diameter of a cylindrical or spherical object, you can use two other tools: a caliper and a micrometer.

A **micrometer** can be used to measure the diameter of a sphere or a cylinder by reading the measurements on the sleeve and the thimble:



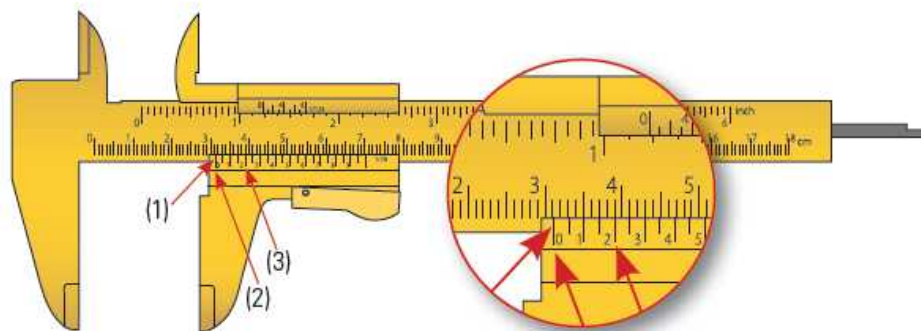
The value on the sleeve represents millimetres and the value on the thimble represents hundredths of a millimetre.

Using the reading below, look at the value on the sleeve first (1), which in this case is 22 millimetres. Then, look at the value on the thimble (2), which is 36, or 0.36 mm. That means the length you've measured is 22.36 mm.



A **caliper** can be used to measure the diameter of an object, inside or outside the object. For example, a paper towel roll is hollow, so the caliper can be used to measure the inside diameter.

The top ruler measures the number of centimetres and millimetres. For this measurement, find the nearest millimetre reading to the left of the 0 on the lower ruler, which in this case is 31 mm (1). The lower ruler is in hundredths of a centimetre. From the 0 on the bottom ruler (2), find the line that matches up perfectly with a line on the top ruler (3). This is at 0.02 cm, so the measurement is 3.12 cm.



HOMEWORK...

Worksheet - Volume of Cones_Pyramids_Spheres.pdf



HOMEWORK...

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6.4 - Build Your Skills Solutions.pdf



SURFACE AREA, VOLUME, AND CAPACITY

Now that you have finished this chapter, you should be able to:

- Explain, using examples, the difference between volume and surface area.
- Explain, using examples and nets, the relationship between area and surface area.
- Estimate and calculate the surface area and volume of a three-dimensional object.
- Explain, using examples, the difference between volume and capacity.
- Convert a volume in one unit of measure, such as cm^3 , to another unit of measure, such as m^3 .
- Determine the volume of a three-dimensional object using a variety of measuring tools, such as rulers, tape measures, micrometers, and calipers.
- Determine the capacity of a three-dimensional object using a variety of measuring tools and methods, such as graduated cylinders, measuring cups, measuring spoons, and displacement.
- Describe the relationship between the volumes of cones and cylinders with the same base and height.
- Describe the relationship between the volumes of pyramids and prisms with the same base and height.
- Explain the effect a change in dimensions of a three-dimensional object has on its surface area and volume.

READY FOR THE TEST???

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Chapter 6 Surface Area, Volume, and Capacity, Practice Your New Skills.pdf



- Sample Test

Chapter 6 Sample Test.pdf



Chapter 6 Sample Test Answers.pdf



Attachments

6.4 - Build Your Skills Solutions.pdf

Chapter 6 Surface Area, Volume, and Capacity, Practice Your New Skills.pdf

Chapter 6 Sample Test.pdf

Chapter 6 Sample Test Answers.pdf

Worksheet - Volume of Cones_Pyramids_Spheres.pdf