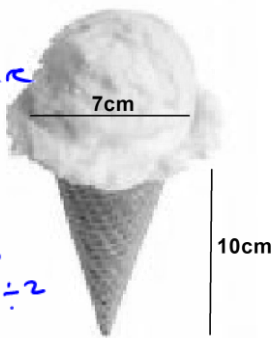
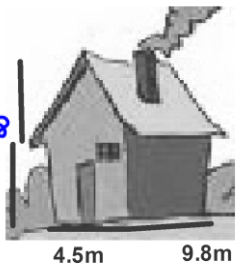
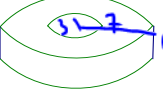
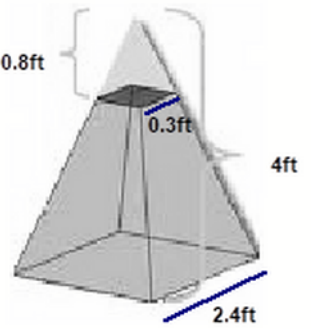
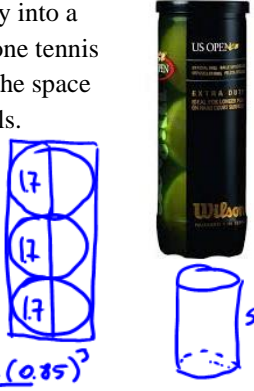
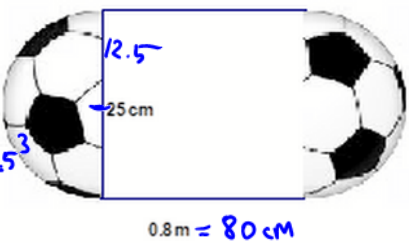


Composite Volume of Prisms, Pyramids, Cylinders, Cones, and Spheres

How to Calculate

1. Calculate the volume of each part of the composite object
2. Add the volumes
3. Subtract the volume of any parts that are removed from the object

Composite shapes are shapes that don't have a 'unique' name, but they are made up of other shapes we are familiar with. An icecream for example, is a cone with a hemisphere.

<p>a. How much icecream is here, assuming the cone is filled with icecream?</p>  $V = V_{\text{cone}} + V_{\text{hemisphere}}$ $= \frac{\pi r^2 h}{3} + \frac{4\pi r^3}{3} \div 2$ $= \frac{\pi (3.5)^2 10}{3} + \frac{4 \cdot \pi \cdot (3.5)^3}{3} \div 2$ $= 128.28 + 89.80 \approx 218.08 \text{ cm}^3$	<p>b. How much air is inside this empty house, which is made up of a rectangular prism base and a triangular prism roof?</p>  $V_{\text{total}} = V_{\text{base}} + V_{\text{roof}}$ $= 2.4 \times 4.5 \times 9.8 + \frac{4.5 \times 2.4 \times 9.8}{2}$ $= 158.76 \text{ m}^3$
<p>c. Pineapple can be bought in sliced rings that look like the sketch provided. If the outer ring has a radius of 7cm and the inner ring has a radius of 3cm, where the height is 1cm in both cases, find the volume of this pineapple slice.</p>  $V = V_{\text{outer}} - V_{\text{inner}}$ $= \pi \cdot 7^2 \cdot 1 - \pi \cdot 3^2 \cdot 1$ $\approx 125.66 \text{ cm}^3$	<p>d. The following shape is called a frustum. It is a square-based pyramid with the tip cut off. Find the volume of the frustum.</p>  $V = V_{\text{big}} - V_{\text{small}}$ $= \frac{(2.4)^2 \times 4}{3} - \frac{(0.3)^2 \times 0.8}{3}$ $= 7.68 - 0.024$ $= 7.656 \text{ ft}^3$
<p>e. Three tennis balls are packaged tightly into a cylindrical container. The diameter of one tennis ball is 1.7in. Determine the volume of the space in the can not taken up by the tennis balls.</p>  <p>height of container = $3 \times 1.7 = 5.1 \text{ in}$</p> <p>radius = $1.7 \div 2 = 0.85 \text{ in}$</p> $V_{\text{space}} = V_{\text{container}} - 3V_{\text{ball}}$ $= \pi (0.85)^2 \times 5.1 - 3 \times \frac{4}{3} \pi \cdot (0.85)^3$ $\approx 3.9 \text{ in}^3$	<p>f. A shipping tube that ships 3-packs of soccer balls is made from a cylindrical center with a hemisphere at each end. Calculate the space that is inside the container. *watch for the units</p>  $V = V_{\text{cyl}} + V_{\text{ball}}$ $= \pi (12.5)^2 80 + \frac{4}{3} \pi (12.5)^3$ $= 47,451 \text{ cm}^3$

ANSWERS: a. 307.7cm³, b. 158.76m³, c. 125.6cm³, d. 7.7ft³, e. 3.9in³, f. 47,427cm³

$\approx 3.9 \text{ in}^3$

