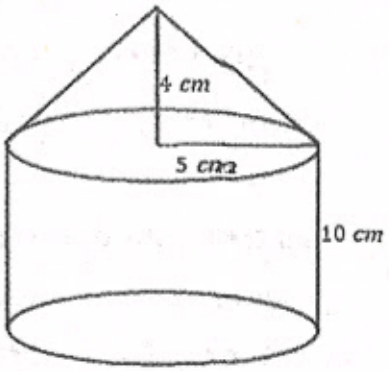
Notes 9.7 Volume of Composite Solids

When a composite solid includes cylinders and cones, you can find the volume be decomposing it into solids whose volumes you know how to find.

Example 1: Find the volume of the solid. Round to the nearest tenth.



Step 1: Find the volume of the cylinder.

$V = Bh$

$V = \pi r^2 h$	Volume of a cylinder formula.
$V = \pi \cdot 5^2 \cdot 10$	Substitute 5 in for r and 10 for h.
$V = \pi \cdot 25 \cdot 10$	Multiply 5^2.
$V = \pi \cdot 250$	Multiply.
$V \approx 785.398$	Multiply.
$V \approx 785.4\ cm^3$	Round.

Step 2: Find the volume of the cone.

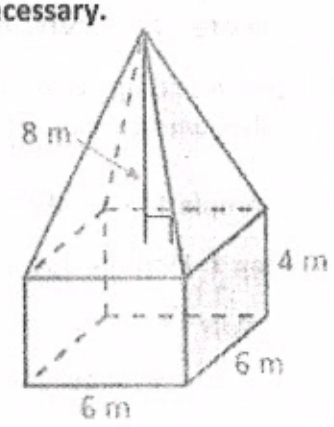
$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(\pi r^2 h)$	Volume of a cone formula.
$V = \frac{1}{3}(\pi \cdot 5^2 \cdot 4)$	Substitute 5 in for r and 4 for h.
$V = \frac{1}{3}(\pi \cdot 25 \cdot 4)$	Multiply 5^2.
$V = \frac{1}{3}(\pi \cdot 100)$	Multiply.
$V \approx 104.719$	Multiply.
$V \approx 104.7\ cm^3$	Round.

Step 3: Add the two volumes together: 785.4 + 104.7 = 890.1

The volume is about 890.1 cubic centimeters.

Example 2: Find the volume of the solid. Round to the nearest tenth if necessary.



Step 1: Find the volume of the pyramid.

$V = \frac{1}{3}Bh$	Volume of a pyramid formula.
$V = \frac{1}{3}(lw)h$	Base is a square.
$V = \frac{1}{3}(6 \cdot 6) \cdot 8$	Substitute 6 in for *l* and *w*. Substitute 8 in for *h*.
$V = 96\ m^3$	Multiply.

Step 2: Find the volume of the prism.

$V = Bh$

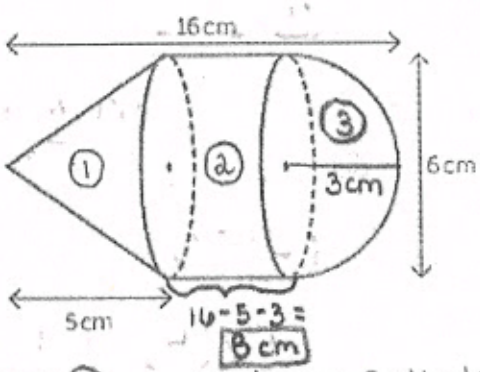
$V = (lw)h$	Volume of a prism formula.
$V = 6 \cdot 6 \cdot 4$	Substitute 6 in for *l*, 6 in for *w*, and 4 in for *h*.
$V = 144\ m^3$	Multiply.

Step 3: Add the two volumes together: 96 + 144 = 240

The volume is 240 m^3.

Try This: Find the volume of the solid. Round to the nearest tenth if necessary.

a.



d = 6 cm
r = 3 cm

Volume Cone ①

$V = \frac{1}{3}Bh$
$V = \frac{1}{3}(\pi r^2)h$
$V = \frac{1}{3}\pi(3)^2(5)$
$V = \frac{1}{3}\pi(9)(5)$
$V = 15\pi$
$V \approx 47.12$
$V \approx 47.1\ cm^3$

Volume Cylinder ②

$V = Bh$
$V = (\pi r^2)h$
$V = \pi(3)^2(8)$
$V = \pi(9)(8)$
$V = 72\pi$
$V \approx 226.19$
$V \approx 226.2\ cm^3$

Volume Hemisphere ③

$V = \frac{1}{2}(\frac{4}{3}\pi r^3)$
$V = \frac{1}{2}(\frac{4}{3}\pi(3)^3)$
$V = \frac{1}{2}(\frac{4}{3}\pi(27))$
$V \approx 56.54$
$V \approx 56.5\ cm^3$

Total Volume

$V \approx 47.1 + 226.2 + 56.5$
$V \approx 329.8\ cm^3$