## Warm-Up


1. Put your phones away.
2. Take out your 2 HWs and 2 Calendars to be checked.

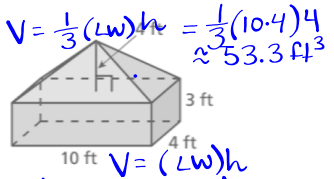
# What am I learning today?

## Learning Objective 4C.2

How to calculate composite volume

**Composite Volume** - The volume of MULTIPLE objects either **ADDED** or **SUBTRACTED**!

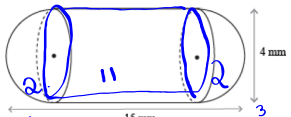
**Calculate the volume of each shape.**




$V = \frac{1}{3}(lw)h = \frac{1}{3}(10.4)4 \approx 53.3\ ft^3$

$V = (lw)h = (10.4)3 = 120\ ft^3$

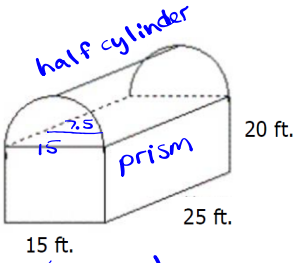
Total $173.3\ ft^3$




Sphere $\frac{4}{3}\pi(2)^3 \approx 33.51\ mm^3$

cylinder $(\pi(2)^2)\,11 \approx 138.23\ mm^3$

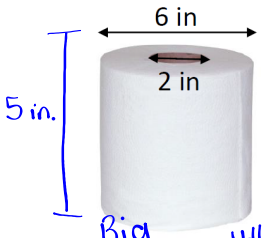
$171.74\ mm^3$




$\frac{(\pi(7.5)^2)}{2}\,25 \approx 2208.9\ ft^3$

$(15 \cdot 25)\,20 \approx 7500\ ft^3$

$9708.93\ ft^3$

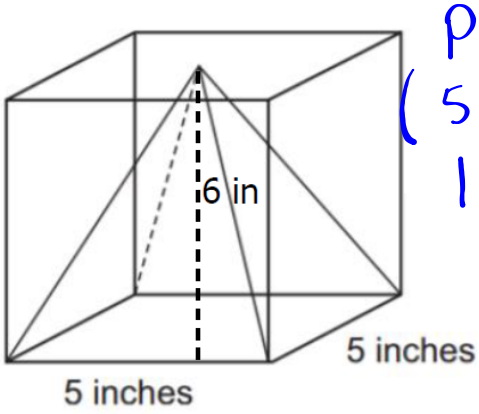



Big $(\pi(3)^2)\,5 \approx 141.4$

small $(\pi(1)^2)\,5 \approx 15.7$

$125.7\ in^3$

**A glass pyramid is packaged inside a box with protective foam. About how many cubic inches of foam is needed to fill the space around the pyramid to protect it from breaking?**




prism − pyramid

$(5.5)6 - \frac{1}{3}(5.5)6$

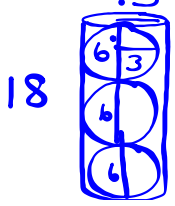
$150 - 50 = 100\ in^3$

# **Geometric Modeling** - Using geometric shapes to model and predict an area or volume

1. A cylindrical oil can is used for cleaning machine parts. It is half full of oil and has a diameter of 9.5 cm and a height of 12.8 cm. What is the volume of the oil in the can?

$V = \frac{(\pi(4.75)^2)12.8}{2} = 453.65\ cm^3$

2. The radius of a tennis ball is 3 in. If there are three balls kept inside a cylindrical container. How much space in the can is not occupied by the tennis balls?



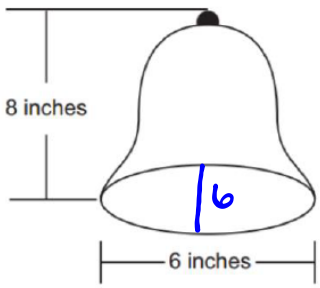

container $\pi(3)^2 \cdot 18$

$508.94\ in^3$

sphere $\frac{4}{3}\pi(3)^3$

$508.94\ in^3 - 3(113.1\ in^3) = 169.6\ in^3$

3. A company needs to package the bell below in a rectangular box. What are the smallest dimensions (length, width, and height) the rectangular box can have so that the lid of the box can close all the way?




prism

$V = (L \cdot W) H$

$V = (6 \cdot 6)\ 8$

$288\ in^3$

- **Population Density** – $\frac{Population}{Area}$

1. If there are 20 people in a room that is 15 ft by 18 ft. What is the population density?

Area = (15·18) = 270 ft²

$\frac{270\ ft^3}{20} = 13.5\ ft^2$

2. At a forest, there is currently 7.5 coyotes per square kilometer. The park spreads over an area of 25 square kilometers. How many total coyotes are there based on this data?

$\frac{7.5}{1} = \frac{x}{25}$

$x = 187.5 \rightarrow 188$ coyotes

3. A major city has an average of 3450 people visit its park at 4PM that has an area of 5.25 $\text{miles}^2$. An outdoor concert is planned and the park is expected to get an additional 1500 people. How did more times larger will the population density be during the concert?

Normal

$\frac{3450}{5.25} \approx 657.1$ people/mi²

Concert

$\frac{4950}{5.25} = 942.9$ mi²

$\frac{942.9}{657.1} = 1.43$ times

## **Classwork**:


Complete the classwork about composite volume and population density. SHOW ALL WORK!

**HW**: Finish your classwork