

# Day 6: Volume of Composite Objects

Tuesday, November 26, 2013 11:56 AM

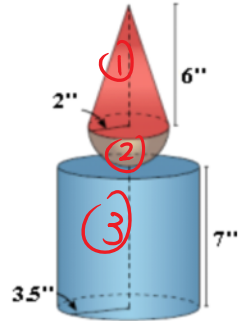
## AW Math 11

→ 3D objects added together

### Day 6 Notes: Volume of Composite Objects

#### Example 1:

Nathan is casting garden gnomes out of concrete. Because the gnomes are an irregular shape, he approximates the gnome as a series of simpler objects: the hat is a cone, the head is a hemisphere, and the body is a cylinder.



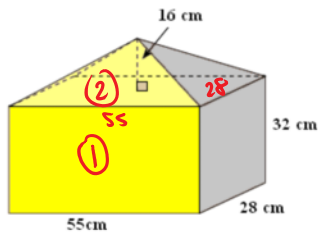
He wants to know how much concrete he will need to make 20 gnomes.

|   |  |  |
|---|--|--|
| <p>① Cone:</p> $V = \frac{1}{3} \pi r^2 h$ $= \frac{1}{3} \times \pi \times 2^2 \times 6$ $= 25.1 \text{ in}^3$ | <p>② <math>\frac{1}{2}</math> Sphere</p> $= \frac{4}{3} \pi r^3$ $= \frac{4}{3} \times \pi \times 3.5^3$ $= 33.5 \div 2$ $= 16.755 \text{ in}^3$ | <p>③ Cylinder</p> $\pi r^2 h$ $= \pi \times 3.5^2 \times 7$ $= 269.4 \text{ in}^3$ |
|---|--|--|

total:  $311.255 \times 20 = 6225.1 \text{ in}^3$

#### Example 2:

You will build a model of a house using a rectangular prism for the base and a rectangular pyramid for the roof. If the model is solid, what is the volume of the model?



① Rectangle:  $L \times W \times H$

$$= 55 \times 28 \times 32$$

$$= 49280 \text{ cm}^3$$

② Pyramid =  $\frac{1}{3} (\text{base area}) \times \text{Height}$

$$\text{Base area} = 55 \times 28$$

$$= 1540 \text{ cm}^2$$

$$= \frac{1}{3} \times 1540 \times 16$$

$$= 8213.33 \text{ cm}^3$$

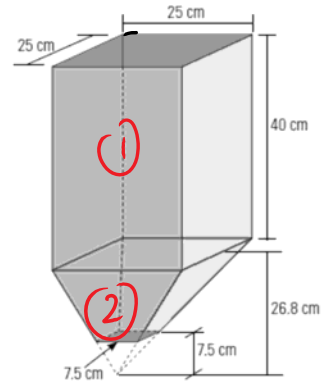
total =  $57493.33 \text{ cm}^3$



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Example 3: \*\*\*

A supermarket bulk food bin shown below contains coffee beans. The bottom has a sliding gate so that the beans can be poured into bags.



a) What is the volume of the bin?

1. Rectangular Prism

$$\begin{aligned}
 &= L \times w \times h \\
 &= 25 \times 25 \times 40 \\
 &= 25\,000 \text{ cm}^3
 \end{aligned}$$

2. Pyramid

$$\begin{aligned}
 &= \frac{1}{3} \times (\text{base area}) \times \text{Height} \\
 &= \frac{1}{3} \times (25 \times 25) \times 26.8 \\
 &= 5583.3 \text{ cm}^3
 \end{aligned}$$

total:  $25000 + 5583.3 - 140.625$

$$= 30\,442.68 \text{ cm}^3$$

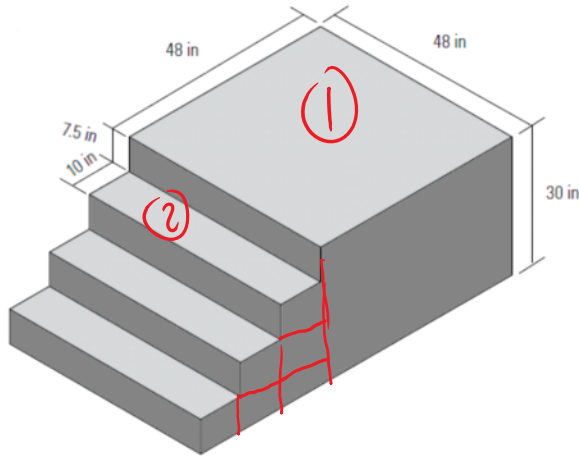
3. Subtract little pyramid

$$\begin{aligned}
 &= \frac{1}{3} \times (\text{base area}) \times \text{Height} \\
 &= \frac{1}{3} \times (7.5 \times 7.5) \times 7.5 \\
 &= 140.625 \text{ cm}^3
 \end{aligned}$$

~~b)~~ One kilogram of coffee beans has a volume of  $2250 \text{ cm}^3$ . How many kilograms of coffee beans does the bin hold?

**Day 6 Assignment: Volume of Composite Objects**

~~B/B/P~~  
1 a) How much concrete, *in cubic inches*, is needed to make the stairs shown below? Assume the stairs are all the same size.



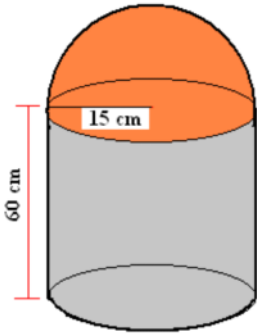
Do last!

2) Draw a *hemispherical dome tent* with a diameter of 7 feet, and find its volume.

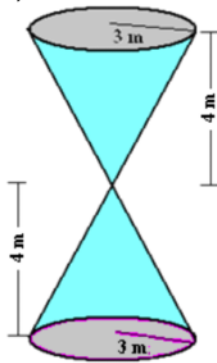


3) Find the volume of each of the following objects.

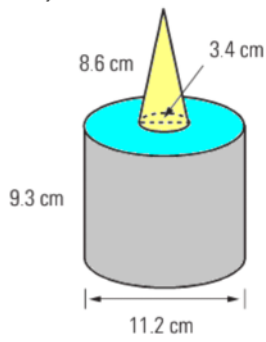
a)



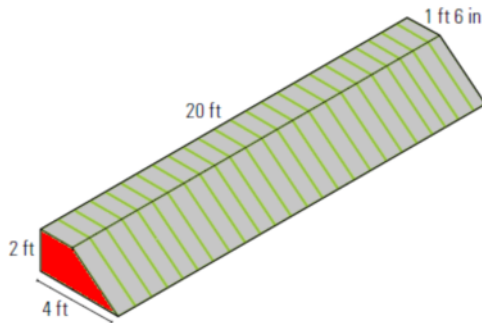
b)



c)



4. Cole works for a tent and awning company. He is asked to give a quote on a shop awning, as shown below.



Any unit adjustments to be made?

- a) What is the volume contained by the shop awning?

- b) What area of fabric should he use in his estimate? *Do not find area of back or sides.*