Module 16d: Volumes of Spheres

Math Practice(s):

-Model with mathematics.

-Look for & make use of structure.

Learning Target(s):

- Apply the formulas for volume to solve problems in real-world context.

Homework:

HW#11: 16d #1-3

Nov 20-12:32 PM

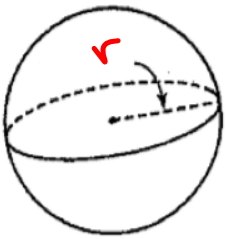
(erase to show)

Sphere (#VOC)

A 3-dimensional figure consisting of all points equidistant from a single point called the center.

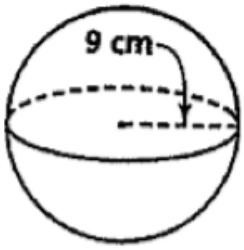
Volume of a Sphere (#THM)

$$V = \frac{4}{3}\pi r^3$$



Example 1: Find the volume of each sphere. Express your answer in exact form and as a decimal rounded to the nearest hundredths place.

a)



$r = 9\text{cm}$

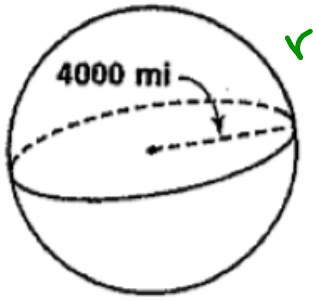
$V = \frac{4}{3} \cdot \pi (9)^3$

$= \frac{4}{1} \cdot \pi \cdot \frac{729}{1}$ 243

$V = 972\pi\ \text{cm}^3$

$V \approx 3053.63\ \text{cm}^3$

b)



$r = 4000\ \text{mi}$

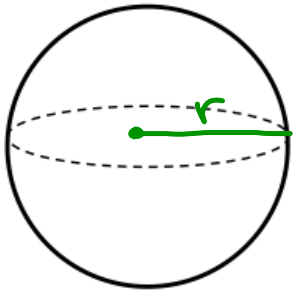
$V = \frac{4}{3}\pi \cdot (4000)^3$

$V = \frac{4}{3}\pi \frac{(64,000,000,000)}{1}$

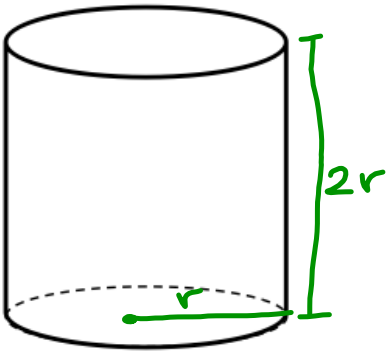
$V = \frac{256,000,000,000\pi\ \text{mi}^3}{3}$

$V \approx 268,082,573,106.34\ \text{mi}^3$

Example 2: The figures shown below are a sphere and a cylinder where the diameter of the sphere is congruent to BOTH the diameter of the base of the cylinder and the height of cylinder. The third figure is provided to show that the sphere fits perfectly inside the cylinder.



$V = \frac{4}{3}\pi r^3$

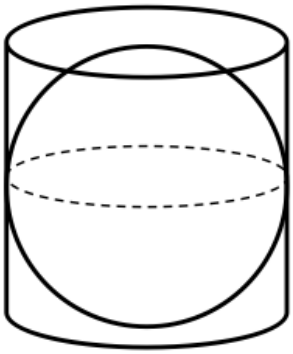


$V = \pi r^2 h$

$V = \pi \cdot r^2 \cdot 2 \cdot r$

$V = 2\pi r^3$

$\frac{6}{3}$



Example 3: A balloon is filled with water, forming a sphereical shape. If it has a radius of 11 cm, how many liters of water was needed to fill the balloon? Round to the nearest tenth. (Hint: $1000cm^3 = 1$ L)

$V = \frac{4}{3}\pi(11)^3$

$V = \frac{5575.3\ cm^3}{1} \cdot \frac{1\ L}{1000\ cm^3}$

$V = 5.5753\ L$

About 5.6 L were needed to fill the balloon.