

Lesson 11: Volume of a Sphere

Classwork

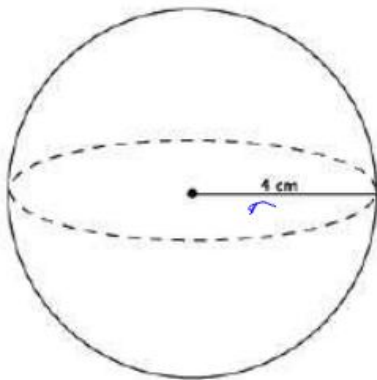
Exercises 1–3

1. What is the volume of a cylinder?
2. What is the height of the cylinder?
3. If $\text{volume}(\text{sphere}) = \frac{2}{3} \text{volume}(\text{cylinder with same diameter and height})$, what is the formula for the volume of a sphere?

$$(4)^3 = 4 \times 4 \times 4 = 64$$

Example 1

Compute the exact volume for the sphere shown below.



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

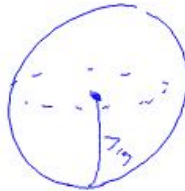
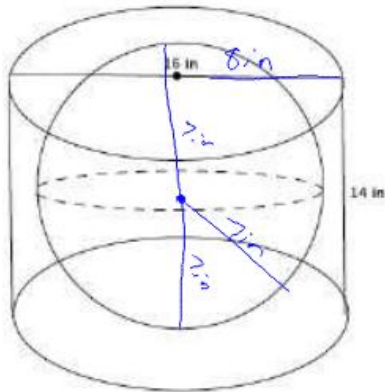
$$V = \frac{4}{3} \pi (4)^3$$

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

$$V = 85\frac{1}{3} \pi \text{ cm}^3$$

Example 2

A cylinder has a diameter of 16 inches and a height of 14 inches. What is the volume of the largest sphere that will fit into the cylinder?



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

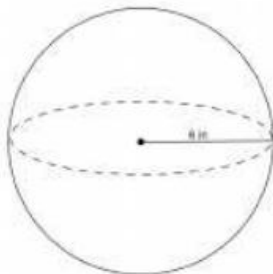
$$V = \frac{4}{3} \pi (7)^3$$

$$V = \frac{4}{3} \pi (343)$$

$$V = 457\frac{1}{3} \pi \text{ in}^3$$

Exercises 4–8

4. Use the diagram and the general formula to find the volume of the sphere.



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

$$= \frac{4}{3} \pi (6)^3$$

$$= \frac{4}{3} \pi (216)$$

$$= 288\pi \text{ in}^3$$

5. The average basketball has a diameter of 9.5 inches. What is the volume of an average basketball? Round your answer to the tenths place.