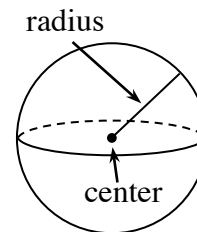


For a sphere with radius r , the volume is found using $V = \frac{4}{3}\pi r^3$.

For more information, see the Math Notes box in Lesson 10.1.5 of the *Core Connections, Course 3* text.



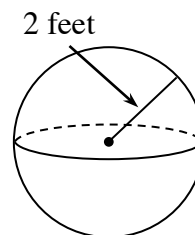
Example 1

Find the volume of the sphere at right.

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 2^3 = \frac{32\pi}{3} \text{ ft}^3 \text{ (exact answer)}$$

or using $\pi \approx 3.14$,

$$\frac{32(3.14)}{3} \approx 33.49 \text{ ft}^3 \text{ (approximate answer)}$$



Example 2

A sphere has a volume of $972\pi \text{ un.}^3$. Find the radius.

Use the formula for volume and solve the equation for the radius.

$$V = \frac{4}{3}\pi r^3 = 972\pi$$

Substitution.

$$4\pi r^3 = 2916\pi$$

Multiply by 3 to remove the fraction.

$$r^3 = \frac{2916\pi}{4\pi} = 729$$

Divide by 4π to isolate r .

$$r = \sqrt[3]{729} = 9$$

To undo cubing, take the cube root.

Problems

Use the given information to find the exact and approximate volume of the sphere.

- radius = 10 cm
- radius = 4 ft
- diameter = 10 cm
- diameter = 3 miles
- circumference of great circle = 12π un.
- circumference of great circle = 3π un.

Use the given information to answer each question related to spheres.

- If the radius is 7 cm, find the volume.
- If the diameter is 10 inches, find the volume.
- If the volume of the sphere is 36π un.³, find the radius.
- If the volume of the sphere is $\frac{256\pi}{3}$ un.³, find the radius.

Answers

- $\frac{4000\pi}{3} \approx 4186.67$ cm³
- $\frac{256\pi}{3} \approx 267.94$ ft³
- $\frac{500\pi}{3} \approx 523.33$ cm³
- $\frac{9\pi}{2} \approx 14.13$ mi³
- $288\pi \approx 904.32$ un.³
- $\frac{9\pi}{2} \approx 14.13$ mi³
- $\frac{1372\pi}{3} \approx 1436.75$ cm³
- $\frac{500\pi}{3} \approx 523.60$ in.³
- $r = 3$ units
- $r = 4$ units