13.3 Volume of Spheres

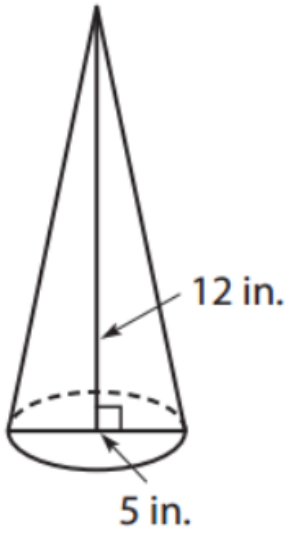
Common Core Standard

8.G.9
Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems

Round your answers to the nearest tenth. Use 3.14 for π.

1. The volume of a cone is 20 cm^3. What is the volume of a cylinder with the same base and height?

2. Find the volume of the cone.



3. Find the volume of a cone with a radius of 20 inches and a height of 25 inches.

① $V = \frac{1}{3}\pi r^2 h$

$\frac{20}{\frac{1}{3}} = \frac{\frac{1}{3}\pi r^2 h}{\frac{1}{3}}$ $= 60\ cm^3$

$60 = \pi r^2 h$

② $V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times 3.14 \times 2.5^2 \times 12$

$\approx 78.5\ in^3$

③ $V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times 3.14 \times 20^2 \times 25$

$\approx 10{,}466.7\ in^3$

13.3 Volume of Spheres

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8.G.9
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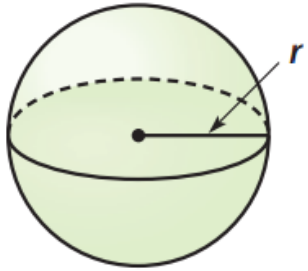
Sphere - a three dimensional figure with all points the same distance from the center

radius - on a sphere is the distance from the center to any point on the sphere

Volume of a Sphere

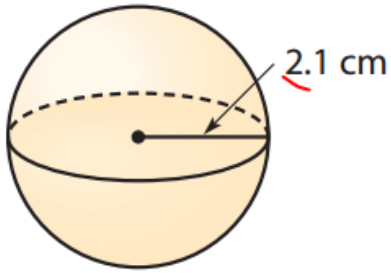
The volume V of a sphere is $\frac{4}{3}\pi$ times the cube of the radius r



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

Find the volume of each sphere. Round your answers to the nearest tenth if necessary. Use 3.14 for π.

A



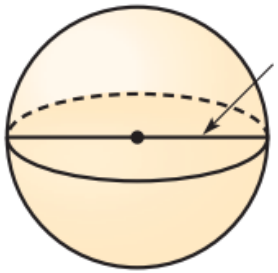
$V = \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times 3.14 \times 2.1^3$

$= \frac{4}{3} \times 3.14 \times 9.261$

$\approx 38.8 \text{ cm}^3$

B



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

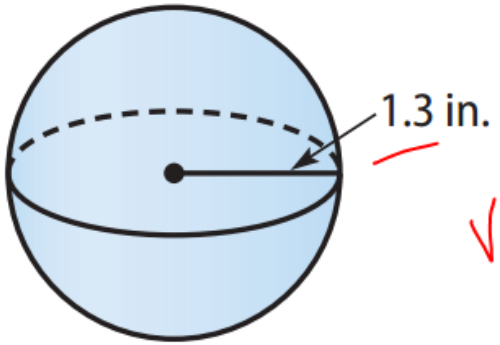
$= \frac{4}{3} \times 3.14 \times 3.5^3$

$= \frac{4}{3} \times 3.14 \times 42.875$

$\approx 179.5 \text{ cm}^3$

Find the volume of each sphere. Round your answers to the nearest tenth if necessary. Use 3.14 for π.

A

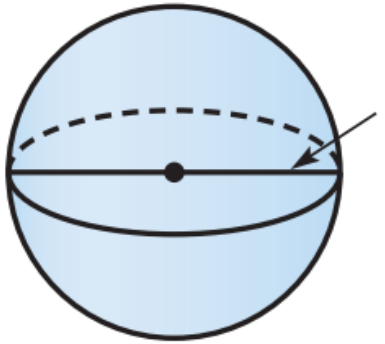


$V = \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times 3.14 \times 1.3^3$

$\approx 9.2 \text{ in}^3$

B

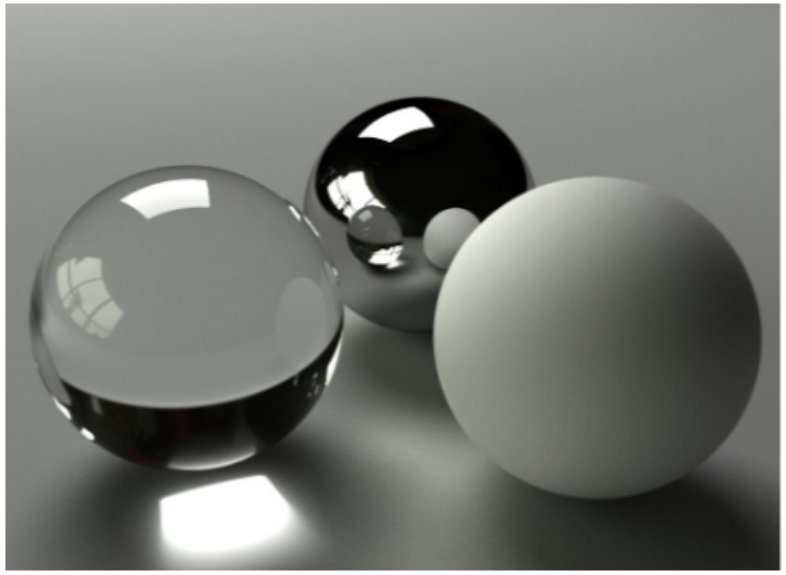


$V = \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times 3.14 \times 4.2^3$

$\approx 310.2 \text{ cm}^3$

Find the volume of each sphere. Round your answers to the nearest tenth. Use 3.14 for π.



2. A sphere has a radius of 10 centimeters.

$V = \frac{4}{3}\pi r^3 \approx 4186.7\text{ cm}^3$

$= \frac{4}{3} \times 3.14 \times 10^3$

$= 4/3 \times 3.14 \times 1000$

3. A sphere has a diameter of 3.4 meters.

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

$= \frac{4}{3} \times 3.14 \times 1.7^3$

$\approx 20.6\text{ m}^3$

Soccer balls come in several different sizes. One soccer ball has a diameter of 22 centimeters. What is the volume of this soccer ball? Round your answer to the nearest tenth. Use 3.14 for π.

STEP 1 Find the radius.

$r = \frac{d}{2} = \frac{22}{2} = 11$

STEP 2 Find the volume of the soccer ball.

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

$= \frac{4}{3} \times 3.14 \times 11^3$

$\approx 5{,}572.5\,cm^3$

A steel ball bearing has a diameter of 1.6 centimeters. What is the volume of this steel ball? Round your answer to the nearest tenth if necessary. Use 3.14 for π.

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

$$= \frac{4}{3} \times 3.14 \times .8^3$$

$$\approx 2.1 \text{ cm}^3$$

Val measures the diameter of a ball as 12 inches. How many cubic inches of air does this ball hold, to the nearest tenth? Use 3.14 for π.

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

$= \frac{4}{3} \times 3.14 \times 6^3$

$\approx 904.3 \text{ in}^3$

H/W

p 414 GP (1-10)

p 415 IP (11-23)