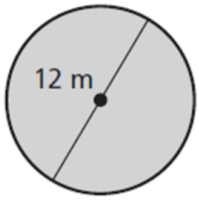
Warm Up

1. Find the area of the circle

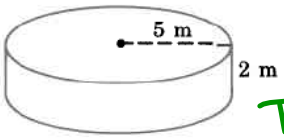


$A = \pi r^2$

$\pi \cdot 6^2$

$113.09\ m^2$

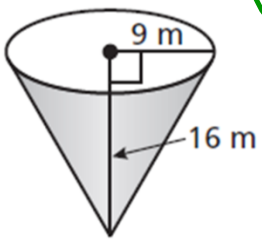
2. Find the volume of the cylinder



$V = \pi r^2 h$

$\pi \cdot 5^2 \cdot 2 = 157.1\ m^3$

3. Find the volume of the cone

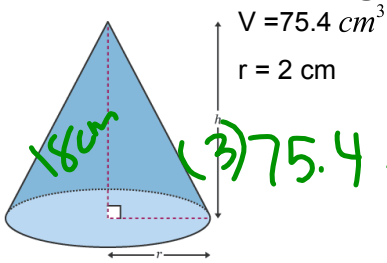


$V = \frac{\pi r^2 h}{3}$

$\frac{\pi \cdot 9^2 \cdot 16}{3}$

$1{,}357.2\ m^3$

4. Find the height of the cone



$V = \frac{\pi r^2 h}{3}$

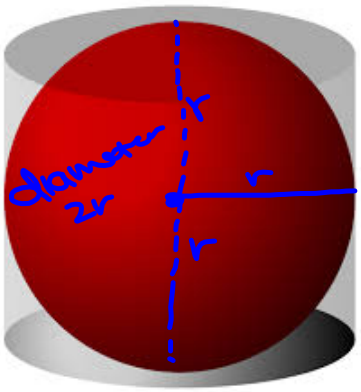
$(3)75.4 = \frac{\pi \cdot 4 \cdot h}{3}(3)$

$\frac{226.2}{(4\pi)} = \frac{4\pi h}{4\pi}$

$18 = h$

How does the volume of a sphere relate to the volume of a cylinder?

https://www.youtube.com/watch?v=8jygxFuLoCk



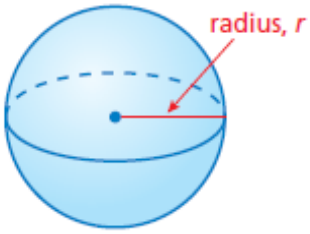
Key Idea

Volume of a Sphere

Words The volume V of a sphere is the product of $\frac{4}{3}\pi$ and the cube of the radius of the sphere.

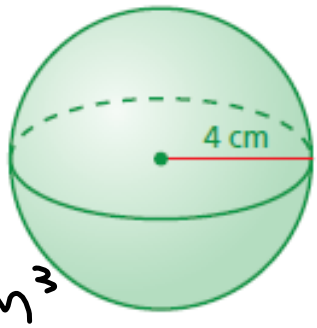
Algebra $V = \frac{4}{3}\pi r^3$

Cube of radius of sphere



Find the volume of the sphere. Round your answer to the nearest tenth.

$$\frac{4 \cdot \pi \cdot 4^3}{3}$$



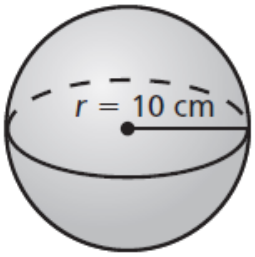
$V \approx 268.1 \text{ cm}^3$

Find the volume of the sphere. Round your answer to the nearest tenth.

1.

523.6 ft³

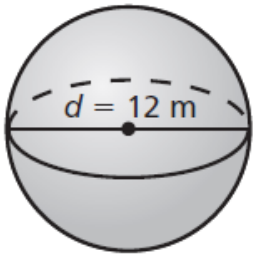
2.



4,188.8 cm³

Find the volume of the sphere. Round your answer to the nearest tenth

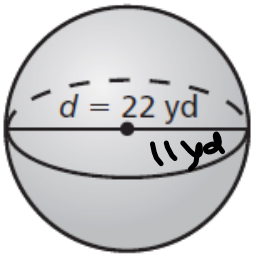
3.



$\frac{4}{3} \cdot \pi \cdot 6^3$

904.8 m^3

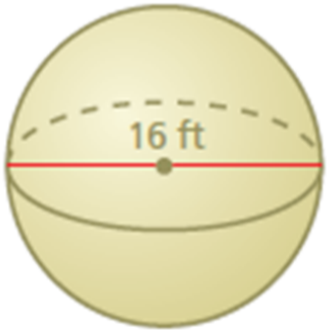
4.



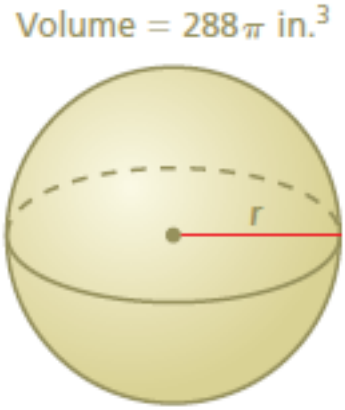
5,575.3 yd^3

Find the volume *V* or of the sphere. Round your answer to the nearest tenth, if necessary.

1.



Find the radius of the sphere.



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

$$\frac{288\pi}{\pi} = \frac{\frac{4}{3}\pi r^3}{\pi}$$

$$3 \cdot 288 = \frac{4r^3}{3} \cdot 3$$

$$\frac{864}{4} = \frac{4r^3}{4}$$

$$\sqrt[3]{216} = \sqrt[3]{r^3}$$

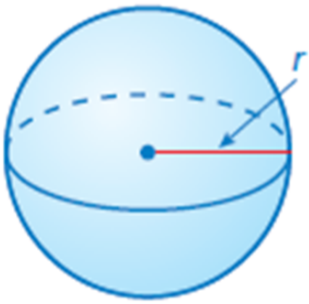
$$\sqrt[3]{} \qquad \sqrt{25} = \sqrt{x^2}$$

$$5 = x$$

$$3 \times \sqrt{216} = r$$

$$= 6$$

Find the volume V or radius r of the sphere. Round your answer to the nearest tenth, if necessary.



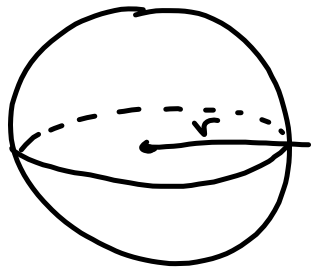
Volume = 36π m^3

$$\frac{36\pi}{\frac{4}{3}\pi} = \frac{\frac{4}{3}\pi r^3}{\frac{4}{3}\pi}$$

$$\frac{36}{1} \cdot \frac{3}{4} = \sqrt[3]{27} = \sqrt[3]{r^3}$$

$$3m = r$$

$V = 214 \text{ in}^3$



$r = ?$

$$\frac{214}{\frac{4\pi}{3}} = \frac{\frac{4}{3}\pi r^3}{\frac{4\pi}{3}}$$

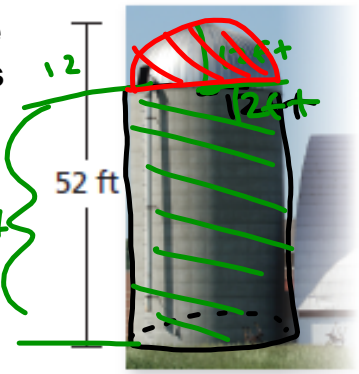
$$214 \cdot \frac{3}{(4\pi)} = r^3$$

$$\frac{642}{4\pi} = r^3$$

$$\sqrt[3]{51.1} = \sqrt[3]{r^3}$$

$$r \approx 3.7 \text{ in}$$

A hemisphere is one-half of a sphere. The top of the silo is a hemisphere with a radius of 12 feet. What is the volume of the silo? Round your answer to the nearest thousand.



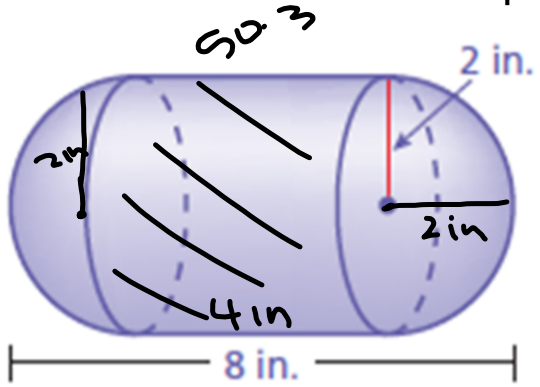
cylinder $V = \pi \cdot 12^2 \cdot 40$
$= 18{,}095.6\ ft^3$

sphere $V = \frac{4}{3}\pi \cdot 12^3 = \frac{7{,}238.2}{2} = 3{,}619.1\ ft^3$

Silo Volume $= 21{,}714.7\ ft^3$

Find the volume of the composite solid. Round your

3.



$V_c = \pi r^2 h$

$\pi \cdot 2^2 \cdot 4 = \underline{50.3}$

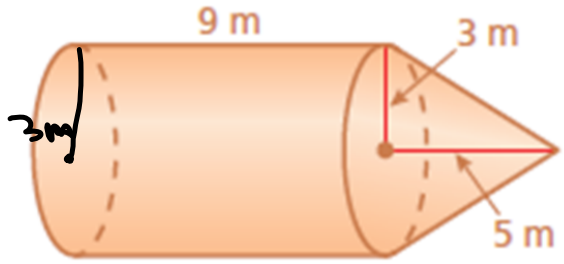
$V_{sp} = \frac{4}{3}\pi 2^3$

$V = \underline{33.5}$

$V = 83.8 \text{ in}^3$

Find the volume of the composite solid. Round your answer to the nearest tenth.

4.



$V = \pi \cdot 3^2 \cdot 9 = 254.5\ m^3$

$V = \frac{\pi \cdot 3^2 \cdot 5}{3} = 47.1\ in^3$

$+$

$= 301.6\ in^3$

The radius of a sphere is 2 centimeters. Find the volume of a cube that the sphere fits snugly within and find the volume of the sphere.

Hw 8.3 pg 352 #'s 3-18 all

8.3 Exercises

Check It Out
Help with Homework
BigIdeasMath.com

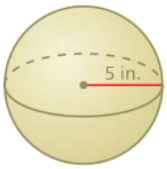
Vocabulary and Concept Check

1. **VOCABULARY** How is a sphere different from a hemisphere?
2. **WHICH ONE DOESN'T BELONG?** Which figure does *not* belong with the other three? Explain your reasoning.

Practice and Problem Solving

Find the volume of the sphere. Round your answer to the nearest tenth.

1

3.


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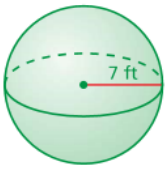

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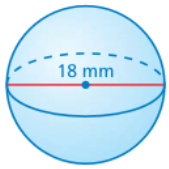

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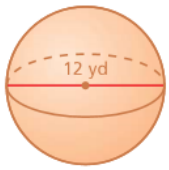

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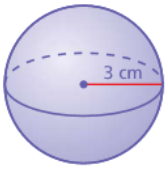

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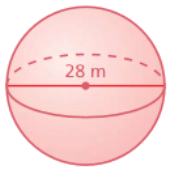


Find the radius of the sphere with the given volume.

2

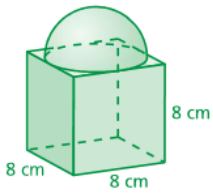
9. Volume $= 972\pi\ \text{mm}^3$
10. Volume $= 4.5\pi\ \text{cm}^3$
11. Volume $= 121.5\pi\ \text{ft}^3$

12. **GLOBE** The globe of the Moon has a radius of 10 inches. Find the volume of the globe. Round your answer to the nearest whole number.

13. **SOFTBALL** A softball has a volume of $\frac{125}{6}\pi$ cubic inches. Find the radius of the softball.

Find the volume of the composite solid. Round your answer to the nearest tenth.

3 **14.**



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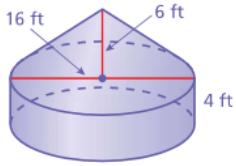

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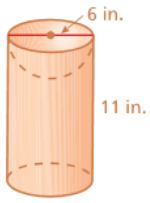


17. REASONING A sphere and a right cylinder have the same radius and volume. Find the radius r in terms of the height h of the cylinder.

18. PACKAGING A cylindrical container of three rubber balls has a height of 18 centimeters and a diameter of 6 centimeters. Each ball in the container has a radius of 3 centimeters. Find the amount of space in the container that is not occupied by rubber balls. Round your answer to the nearest whole number.

Volume $= 4500\pi$ in.^{3}

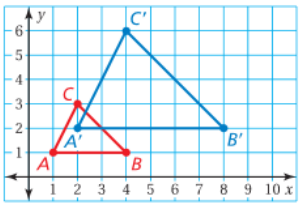
19. BASKETBALL The basketball shown is packaged in a box that is in the shape of a cube. The edge length of the box is equal to the diameter of the basketball. What is the surface area and the volume of the box?

20. Logic Your friend says that the volume of a sphere with radius r is four times the volume of a cone with radius r. When is this true? Justify your answer.

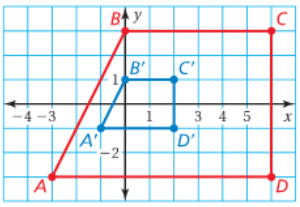
Fair Game Review *What you learned in previous grades & lessons*

The blue figure is a dilation of the red figure. Identify the type of dilation and find the scale factor. *(Section 2.7)*

21.



22.



23. MULTIPLE CHOICE A person who is 5 feet tall casts a 6-foot-long shadow. A nearby flagpole casts a 30-foot-long shadow. What is the height of the flagpole? *(Section 3.4)*

Ⓐ 25 ft Ⓑ 29 ft Ⓒ 36 ft Ⓓ 40 ft