Teacher___Mrs. Wood____ Subject _Math_____ Dates: Week 4 (May 11 - May 15)   7-12 Weekly Planner

Welcome to our Distance Learning Classroom!   **Student Time Expectation per day: 30 minutes**

Content Area & Materials	Learning Objectives	Tasks	Check-in Opportunities	Submission of Work for Grades

8th Grade Math
 	
PAPER PACKET:
Digits 13-2
• **Lesson and examples**
• **Close and Check**
• **Homework worksheet**
Digits 13-4
• **Lesson and examples**
• **Close and Check**
• **Homework worksheet**
Digits 13-6
• **Lesson and examples**
• **Close and Check**
. **Homework worksheet**
 	
ONLINE:
• **Digits 13-2 (lessons and homework)**
• **Digits 13-4 (lessons and homework)**
• **Digits 13-6 (lessons and homework)**
	Essential Question: How can volume formulas of cylinders, cones and spheres be used to solve real world problems?
	
	Students will know...
	· How to use the formulas correctly for finding the volume of a cylinder, cone, and sphere.
	
	• How to apply using these formulas for finding real world volume of items. (ice cream cone, can, ball, etc.)
		PAPER PACKET: Please work through each part of the lessons, examples, "Close and Check," and homework for Digits 13-2, 13-4, and 13-6. Be sure to work out the examples and "Got Its" on paper and check your work with the solutions provided.
		
		-or-
		
		ONLINE: Please log on to pearsonrealize.com to work through each part of the lessons for Digits 13-2, 13-4, and 13-6. The "Close and Check" page can be found by clicking on "Companion Page" at the bottom of the Close and Check screen for each lesson. **Don't forget to click on Solution at the bottom of each example and "Got it?" to check your answer.**
			Mrs. Wood is available during office hours at the times below by:
			• Meeting on Microsoft Teams or Zoom. Access by
			   Teams: logging in with student email and password to Office 365 at https://www.tracy.k12.ca.us/students
			   Zoom: clicking the link that is emailed out prior to the meeting.
			• by email (cwood@tusd.net)
			• call/text (209-597-8652)
			
			Email or call/text will get a response within 24 hours.
				Students are expected to submit:
				1. 13-2 Homework
				2. 13-4 Homework
				3. 13-6 Homework
				
				If submitting the PAPER PACKET on May 15, label with:
				   Mrs. Wood
				   Your full name
				   class period
				Submit the hard copy to the school on May 15 or take pictures of the work and text/email to Mrs. Wood by May 15.
				
				ONLINE (by May 15): Submit homework in Digits and email any written work (scanned document or cell phone picture).

Scheduled, *if possible*, **Shared Experience**	Teams/Zoom meetings and phone calls can facilitate meaningful discussions.
Scaffolds & Supports	Students working ONLINE should try out the Help functions in Digits. Notes for each lesson are included with the PAPER PACKETS.

| **Teacher Office Hours** Available by Teams/Zoom, email, and call/text	**Monday 11:30am–12:30pm**	**Tuesday 10–11am**	**Wednesday 11:30am–12:30pm**	**Thursday 10–11am**	**Friday 11:30am–12:30pm**

13.2 Volumes of Cylinder

Focus question: Why might you want to find the volume of a cylinder?

Vocabulary:

Volume of a cylinder

The volume of a cylinder is the number of unit cubes, or cubic units, needed to fill the cylinder. The formula for the volume of a cylinder is $V = \pi r^2 h$, where r represents the radius of a base and h represents the height of the cylinder.
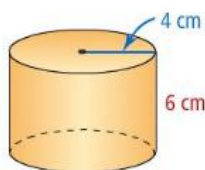
Example
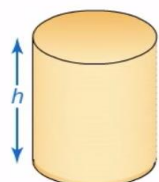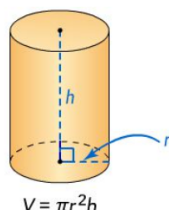
$$V = \pi r^2 h$$

The formula for the volume of a cylinder is the area of the base times the height.

The area of the circular base is represented by πr^2.

$V = Bh$

$\quad = (\pi r^2)h$

$\quad = \pi r^2 h$

The volume of a cylinder is represented by $\pi r^2 h$.

Part1:

$V = \pi r^2 h$
$\quad = \pi(4)^2(6)$
$\quad = 96\pi$

The volume of the cylinder is 96π cm^3.
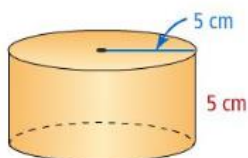
$V = \pi r^2 h$
$\quad = \pi(5)^2(5)$
$\quad = 125\pi$

The volume of the cylinder is 125π cm^3.
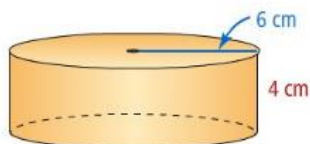
$V = \pi r^2 h$
$\quad = \pi(6)^2(4)$
$\quad = 144\pi$

The volume of the cylinder is 144π cm^3.
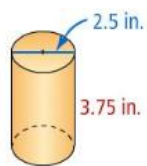
Try:

Find the volume. Leave the answer in terms of π.

10 cm

12 cm
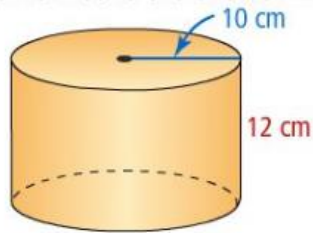
Answer:_____

Part2:

For an art project, you plan to pour different colored sand into a vase with a volume of 47.5 in.^{3}. You have three cylindrical bottles of sand. Do you have enough sand to fill the vase? Explain. Use 3.14 for π.

2.5 in.

3.75 in.

Find the volume of sand in the bottles and then compare that volume to the volume of the vase.

The amounts of sand in the three cylindrical bottles are identical. So you can find the volume of sand in one bottle, and then multiply by three.

To calculate the volume of the sand in one bottle, first find the radius.

$$\text{radius} = \frac{\text{diameter}}{2}$$
$$= \frac{2.5}{2}$$
$$= 1.25$$

Then use the formula for the volume of a cylinder.

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

Substitute 1.25 for r, 3.75 for h, and 3.14 for π.
$$\approx (3.14)(1.25)^2(3.75)$$

Multiply.
$$\approx 18.4$$

One bottle holds about 18.4 in.^{3} of sand.

$$3 \text{ bottles of sand} \approx 18.4 \cdot 3$$
$$= 55.2$$

Three bottles hold about 55.2 in.^{3} of sand. Compare this to the volume of the vase you want to fill.

Volume of the sand you have | Volume of the vase

55.2 > 47.5
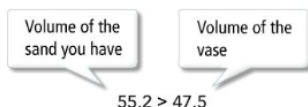
Yes, there is enough sand to fill the entire vase.

Try:

You are preparing juice from a can of liquid juice concentrate. The directions say to add three cans of water to the concentrate, and then stir. To the nearest cubic inch, how much juice will you have?

2.25 in.

4.25 in.
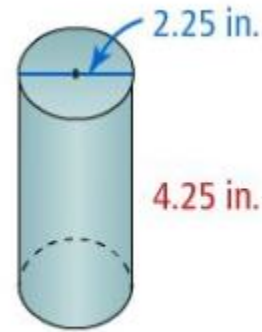
Answer_____

Part3:

A company is designing a can for a new green iced tea. The volume of the can will be 15 in.^{3}. To the nearest tenth of an inch, what is the radius of the can? Use 3.14 for π.

GREEN
ICED TEA

4.8 in.

|	
Use the formula for the volume of a cylinder.	$V = \pi r^2 h$
Substitute 15 for V and 4.8 for h.	$15 = \pi r^2(4.8)$
Use 3.14 for π.	$15 \approx (3.14)r^2(4.8)$
Simplify.	$15 \approx 15.07 r^2$
Divide each side of the equation by 15.07.	$\dfrac{15}{15.07} = \dfrac{15.07 r^2}{15.07}$
Simplify.	$1.00 \approx r^2$
Find the positive square root of each side of the equation.	$\sqrt{1.00} = \sqrt{r^2}$
Simplify.	$1.0 = r$

The radius of the can is about 1.0 in.

Try:

🔊 **Got It?**

What is the radius of a cylinder that has a volume of 192π cubic feet and a height of 12 feet?

12 feet
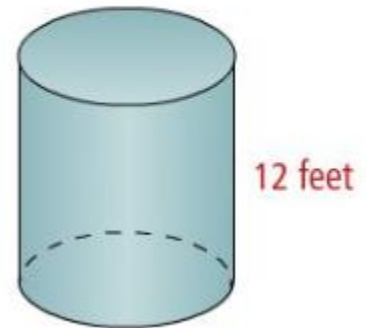
Answer_____

Summary:

Sample: The volume of a cylinder is the amount of something contained inside. Many foods are sold in cylindrical containers, so you would want to know the volume you are buying. Or you may want to know how much you can fit into a cylinder.

Answer: Part1 Try : 1200π
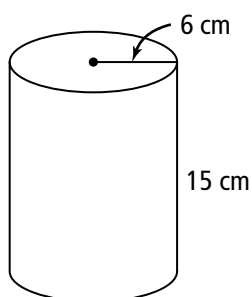
Part2 Try: $68\ in^3$

Part3 Try: 4 ft

Close and Check

Why might you want to find the volume of a cylinder?

Do you know HOW?

1. Find the volume. Leave the answer in terms of π.

6 cm

15 cm

2. The volume of a can of tuna is 562.76 cm³. Find the radius of the can to the nearest tenth. Use 3.14 for π.

10.16 cm
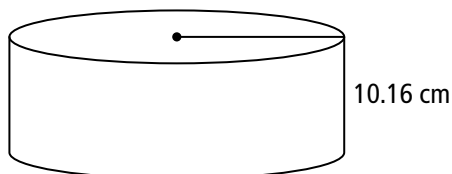
Do you UNDERSTAND?

3. Reasoning A pitcher holds 1,614.7 in.³ of liquid. Each can of punch is 15 in. tall with a diameter of 8 in. How many full cans will the pitcher hold? Explain.

4. Error Analysis A large can of beans has twice the radius and height of a small can of beans. Your friend says that the large can has twice the volume of the small can. Is he correct? Explain.
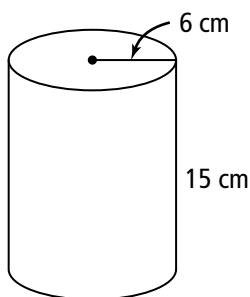
Close and Check

Focus Question

Why might you want to find the volume of a cylinder?

Sample: The volume of a cylinder is the amount of something contained inside. Many foods are sold in cylindrical containers, so you would want to know the volume you are buying. Or you may want to know how much you can fit into a cylinder.
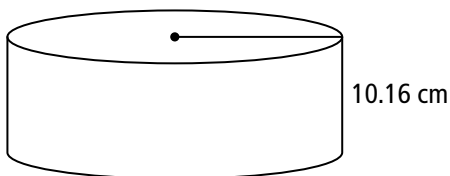
SAMPLE SOLUTIONS ARE SHOWN BELOW.

Do you know **HOW**?

1. Find the volume. Leave the answer in terms of π.

6 cm

15 cm

540π cm^3

2. The volume of a can of tuna is 562.76 cm^3. Find the radius of the can to the nearest tenth. Use 3.14 for π.

10.16 cm

4.2 cm

Do you **UNDERSTAND**?

3. Reasoning A pitcher holds 1,614.7 in.^{3} of liquid. Each can of punch is 15 in. tall with a diameter of 8 in. How many full cans will the pitcher hold? Explain.

It holds 2 cans of punch.

Divide the volume of the pitcher by the volume of one can (753.6 in.^{3}).

4. Error Analysis A large can of beans has twice the radius and height of a small can of beans. Your friend says that the large can has twice the volume of the small can. Is he correct? Explain.

No. The volume of the small can is $\pi r^2 h$. The volume of the large can is $\pi \cdot (2r)^2 \cdot 2h = 8\pi r^2 h$. So, the volume of the larger can is 8 times the volume of the smaller can.

Digital Resources
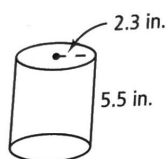
1.

4 in.

3 in.
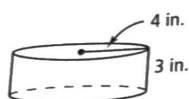
(This figure is not to scale.)

a. Find the volume of the cylinder. Write an exact answer in terms of π.

b. Find the volume of a cylinder with the same radius and double the height. Write an exact answer in terms of π.

2. A can of vegetables has a radius 2.3 in. and a height 5.5 in. Find the volume of the can. Use 3.14 for π. Round to the nearest tenth as needed.

2.3 in.

5.5 in.

(This figure is not to scale.)

3. The volume of a cylinder is $1,029\pi$ cm³. The height of the cylinder is 21 cm. What is the radius of the cylinder? Simplify your answer.

4. A company is designing a new cylindrical water bottle. The volume of the bottle will be 103 cm³. The height of the water bottle is 8.1 cm. What is the radius of the water bottle? Use 3.14 for π. Round to the nearest tenth as needed.π

8.1 cm
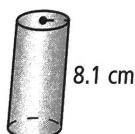
5. You are building a sand castle and want to use a bucket that holds a volume of 885 in.³ and has height 11.7 in.

11.7 in.
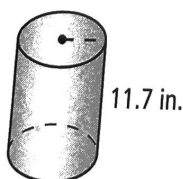
a. What is the radius of the bucket? Use 3.14 for π.

b. If the height of the bucket is changed, but the volume stays the same, then how will the radius change? Explain.

6. a. Writing Find the volume of a cylinder with radius 10 m and height 8 m. Write an exact answer in terms of π.

b. How does the volume change when the height is tripled? When the radius is tripled? Explain.

7. Error Analysis The cylinder is filled with water. A student was asked to find the volume of water in the cylinder using 3.14 for π. He was asked to decide if the water will fill the rectangular container. He incorrectly said the volume of water in the cylinder is 45.9 in.³ and that the water will fill the rectangular container.

1.5 in.

5.1 in.

5.1 in.

3 in.

3 in.
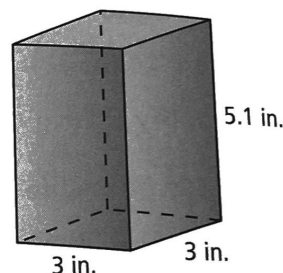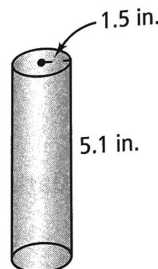
(These figures are not to scale.)

a. Find the volume of water in the cylinder. Round to the nearest tenth as needed.

b. Will the water fill the rectangular container?

c. What mistake might the student have made?

8. a. Find the volume of a cylinder with diameter 8 ft and height 6 ft.

b. Find the volume of the cylinder with the height and radius quadrupled.

c. How many times greater is the volume of the larger cylinder than the smaller cylinder?
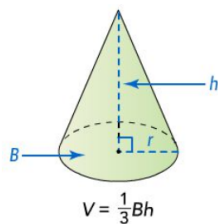
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13.4 Volumes of Cones

Focus Question: Why might you want to find the volume of a cone?
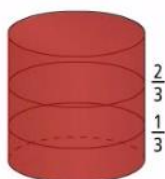
Vocabulary:

Volume of a cone

The volume of a cone is the number of unit cubes, or cubic units, needed to fill the cone. The formula for the volume of a cone is $V = \frac{1}{3} Bh$, where B represents the area of the base and h represents the height of the cone.
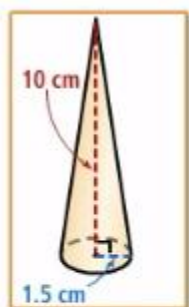
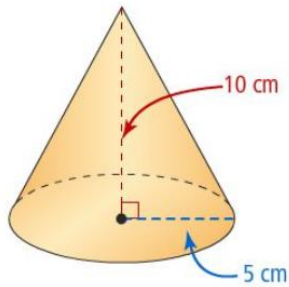**Example**

$$V = \frac{1}{3}Bh$$

$$V = \frac{1}{3}Bh$$
$$V = \frac{1}{3}\pi r^2 h$$

Part1:

Use $V = \frac{1}{3}\pi r^2 h$ to find the volume of the cone.

$$V = \frac{1}{3}\pi r^2 h$$

$$= \frac{1}{3}\pi (1.5)^2 (10)$$

$$= 7.5\pi$$

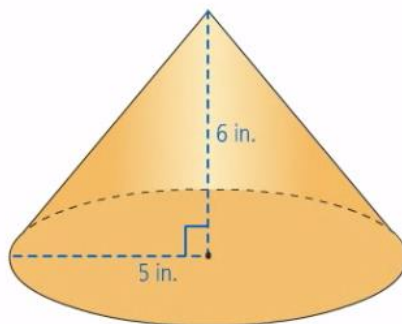The volume of the cone is about 7.5π cm^3.

Try:

Find the approximate volume of the cone in terms of π.

-10 cm

-5 cm

Answer_____

Part2:

You are making some bug repellant candles for an outdoor barbeque. What is the volume of wax needed for one of the candles? Use 3.14 for π.

6 in.

5 in.

Use the formula for the volume of a cone. $V = \frac{1}{3}\pi r^2 h$

Substitute 5 for r and 6 for h. $\approx \frac{1}{3}(3.14)(5)^2(6)$
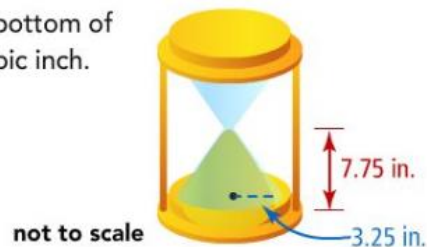
Simplify. $= 157$

The volume of wax needed to make one candle is about 157 in.^{3} .

Try:

Find the volume of sand in the bottom of the hourglass to the nearest cubic inch. Use 3.14 for π.
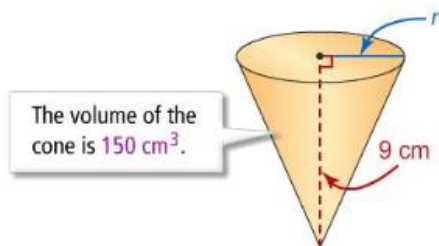

7.75 in.

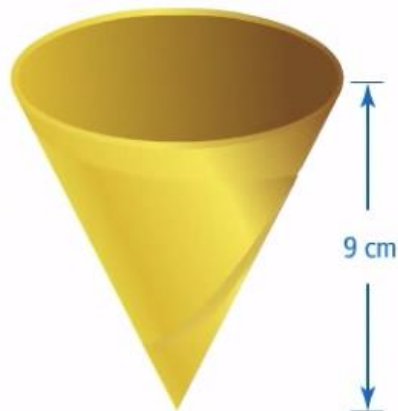**not to scale**   -3.25 in.

Answer_____

Part3:

🔊 Example

A shaved-ice vendor wants a new cone to hold about 150 cm³ of shaved ice when filled to the brim. To the nearest tenth of a centimeter, what should the radius of the cone be?

9 cm

The volume of the cone is 150 cm³.

9 cm

Use the formula for the volume of a cone to find the radius.

Use the volume formula.	$V = \frac{1}{3}\pi r^2 h$
Substitute 9 for h, 150 for V, and 3.14 for π.	$150 \approx \frac{1}{3}(3.14)(r^2)(9)$
Multiply.	$150 = 9.42r^2$
Divide each side by 9.42.	$\frac{150}{9.42} = \frac{9.42r^2}{9.42}$
Simplify.	$15.92 \approx r^2$
	$r^2 = 15.92$
Find the positive square root of each side.	$r = \sqrt{15.92}$
Simplify.	$r \approx 3.99$

The radius of the cone should be about 4.0 cm.

Try:

The volume of the tepee is 471 ft^3. To the nearest foot, what is the radius? Use 3.14 for π.

12.5 ft

Answer_____

Summary:

Sample: You may want to determine what size cone will hold the most ice cream, or what size tepee has the most space inside. Anytime you need to measure the interior of a cone, use the volume formula.

Answer:

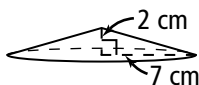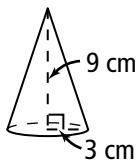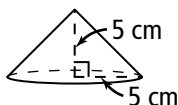Try part1: $83\pi cm^3$

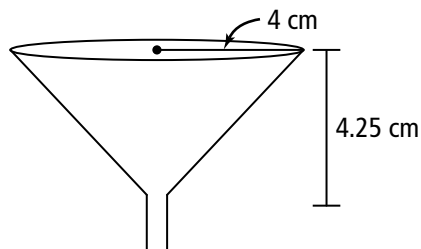Try part2 : $86 in.^3$

Try part3: 6ft

Close and Check

Do you know HOW?

1. Number the cones from 1 to 3 in order from least to greatest volume.

5 cm
5 cm

9 cm
3 cm

2 cm
7 cm

2. Find the volume of the funnel to the nearest cubic centimeter. Use 3.14 for π.

4 cm

4.25 cm

Do you UNDERSTAND?

3. Reasoning A juice company repackages individual juice cans in cone-shaped containers with the same volume. The can is 3 in. tall with a diameter of 2 in. What could be the dimensions of the cone container? Explain.

_____

_____

_____

_____

_____

4. Writing A baker pours sugar into a cylindrical jar using the funnel from Exercise 2. If the jar holds 850 cm^3, about how many times will he have to fill the funnel before the jar is full? Explain.

_____

_____

_____
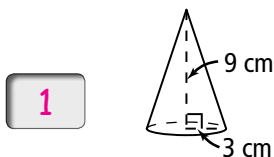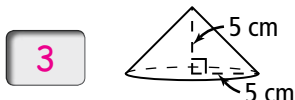
_____

Close and Check

Focus Question

Why might you want to find the volume of a cone?

Sample: You may want to determine what size cone will hold the most ice cream, or what size tepee has the most space inside. Anytime you need to measure the interior of a cone, use the volume formula.

Do you know HOW?

1. Number the cones from 1 to 3 in order from least to greatest volume.

    3 5 cm / 5 cm

    1 9 cm / 3 cm

    2 2 cm / 7 cm

2. Find the volume of the funnel to the nearest cubic centimeter. Use 3.14 for π.

    4 cm

    4.25 cm
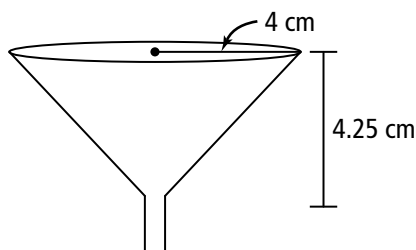
    71 cm³

Do you UNDERSTAND?

3. **Reasoning** A juice company repackages individual juice cans in cone-shaped containers with the same volume. The can is 3 in. tall with a diameter of 2 in. What could be the dimensions of the cone container? Explain.

    9 in. tall with a diameter of 2 in. The volume of a cone is $\frac{1}{3}$ that of a cylinder, so multiply the height of the can by 3.

4. **Writing** A baker pours sugar into a cylindrical jar using the funnel from Exercise 2. If the jar holds 850 cm³, about how many times will he have to fill the funnel before the jar is full? Explain.
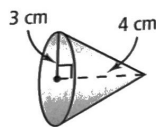
    He will fill it 12 times. Divide the volume of the cylinder by the volume of the funnel.

1. What is the exact volume of the figure? Write an exact answer in terms of π.

3 cm   4 cm

(The figure is not drawn to scale.)

2. Order the cones described below from least to greatest volume.

Cone 1: radius 6 cm and height 12 cm

Cone 2: radius 12 cm and height 6 cm

Cone 3: radius 9 cm and height 8 cm

3. How many cubic meters of material are there in a conical pile of dirt that has radius 11 meters and height 6 meters? Use 3.14 for π. Round to the nearest hundredth as needed.

4. Think About the Process

a. What is the radius of a cone with diameter d?

A. The radius is d.

B. The radius is $\frac{d}{2}$.

C. The radius is $2d$.

D. There is not enough information to find the radius of the cone.

b. An ice cream cone is filled exactly level with the top of the cone. The cone has a 9-cm diameter and 9-cm depth. Approximately how much ice cream (in cm³) is in the cone? Use 3.14 for π.

5. A special stainless steel cone sits on top of a cable television antenna. The cost of the stainless steel is $8.00 per cubic centimeter. The cone has radius 12 cm and height 10 cm. What is the cost of the stainless steel needed to make this solid steel cone? Use 3.14 for π. Round to the nearest cent as needed.

6. The volume of the cone is 147π yd³. What is the radius of the cone?

9 yd
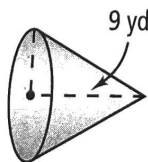
(The figure is not drawn to scale.)

7. An artist creates a cone-shaped sculpture for an art exhibit. If the sculpture is 7 feet tall and has total volume 109.9 cubic feet, what is the radius of the sculpture? Use 3.14 for π.

8. The volume of a cone-shaped hole is 49π ft³. If the hole is 3 ft deep, what is the radius of the hole?

9. Think About the Process

a. What might be a good first step when solving the equation $V = \frac{1}{3}\pi r^2 h$ for r? Select all that apply.
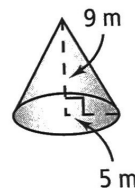
A. Divide each side of the equation by 3.

B. Multiply each side of the equation by 3.

C. Divide each side of the equation by h.

D. Multiply each side of the equation by h.

b. A prop for a movie is a cone with height 36 yd and volume $56\frac{1}{3}\pi$ yd³. Find the radius of the cone.

10.

9 m

5 m

(The figure is not drawn to scale.)

a. Writing Find the exact volume of the cone. Write an exact answer in terms of π.

b. Explain why an answer in terms of π is more accurate than an answer that uses 3.14 for π.

11. a. Reasoning A cone with radius 3 and height 11 has its radius quadrupled. How many times greater is the volume of the larger cone than the smaller cone?

b. Explain how the volume of the cone would change if the radius were divided by four.
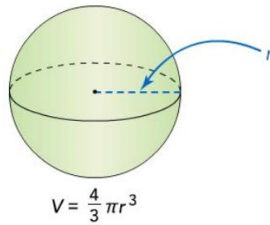
13.6 Volumes of spheres

Focus question: Why might you want to find the volume of a sphere?
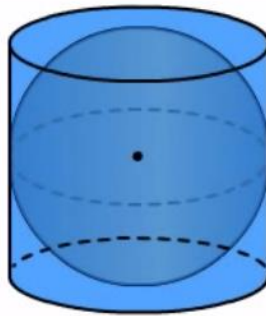
Vocabulary:

Volume of a sphere

The volume of a sphere is the number of unit cubes, or cubic units, needed to fill the sphere. The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$.
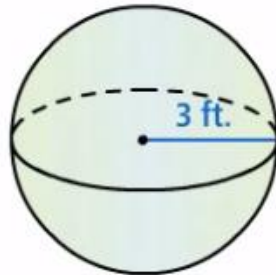
Example

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

The formula for the volume of this cylinder is $V = 2\pi r^3$.

The sphere filled two-thirds of the space in the cylinder.

Volume of the sphere $= \frac{2}{3}$(Volume of the cylinder)
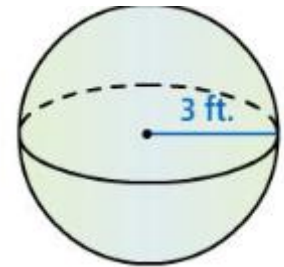
$= \frac{2}{3}(2\pi r^3)$

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

\

To the nearest cubic foot, how much space is contained inside the water-walking ball? Use 3.14 for π.

Use the formula for the volume of a sphere. $V = \left(\frac{4}{3}\right)\pi r^3$

Substitute 3.14 for π and 3 for r. $\approx \left(\frac{4}{3}\right)(3.14)(3)^3$
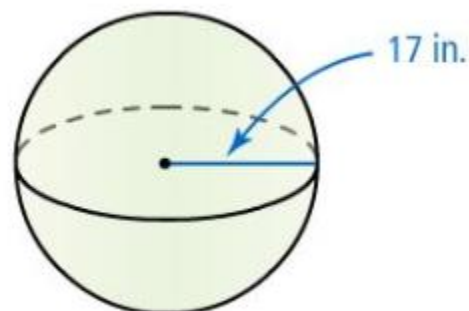
Simplify. $= 113.04$

There is about 113 ft^3 of space inside the water-walking ball.

Try:

Find the volume of the sphere to the nearest cubic inch. Use 3.14 for π.

17 in.

Part2:

■

When it spins, the quarter forms what appears to be a sphere. To the nearest hundredth of a cubic inch, how much space does the spinning quarter occupy? Use 3.14 for π.
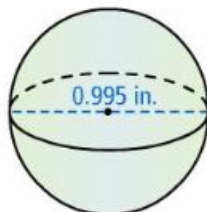
|←0.995 in.→|

Step 1 Find the radius.

$$\text{Radius} = \frac{\text{Diameter}}{2}$$

$$= \frac{0.995}{2}$$

0.995 in.

$$= 0.4975$$

Step 2 Find the volume.

Use the formula for the volume of a sphere. $V = \left(\frac{4}{3}\right)\pi r^3$

Substitute 3.14 for π and 0.4975 for r. $\approx \left(\frac{4}{3}\right)(3.14)(0.4975)^3$

Simplify. ≈ 0.52

The space occupied by the spinning quarter is about 0.52 in.^{3}.

Try:

To the nearest tenth of a cubic millimeter, what is the volume of the sphere that appears when a nickel is spinning? Use 3.14 for π.

21.21 mm

Part3:

An agate geode is spherical and has a volume of about 904 cm^3. Geodes are often found in gem shops sliced in half like the one shown. What is the radius of the geode to the nearest centimeter?

Use 3.14 for π.

r=
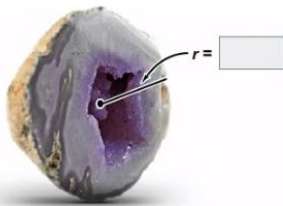
Use the formula for the volume of a sphere. $V = \left(\frac{4}{3}\right)\pi r^3$

Substitute 904 for the volume and 3.14 for π. $904 \approx \left(\frac{4}{3}\right)(3.14)\, r^3$

Multiply. $904 \approx 4.19 r^3$

Divide each side by 4.19. $\dfrac{904}{4.19} \approx \dfrac{4.19 r^3}{4.19}$

Simplify. $215.75 \approx r^3$

Find the cube root of each side. $\sqrt[3]{215.75} \approx r$

Simplify. $6.00 \approx r$

The radius of the geode is about 6 cm.

Try:

To the nearest foot, what is the radius of a sphere that has a volume of 523 ft^3? Use 3.14 for π.

Answer_____

Summary:

Sample: You may want to determine the amount of fruit inside an orange, the amount of metal needed to make a solid ball, or the air inside a water walking ball. Anytime you need to measure the interior of a sphere, use the volume formula.

Answers

Try Part1:$20569 in^3$

Try part2:$4,993.5 mm^3$

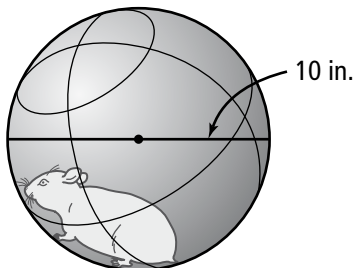Try part3: 5ft

Close and Check

Focus Question

Why might you want to find the volume of a sphere?

Do you know HOW?

1. To the nearest cubic inch, how much space is there inside the ball for the hamster? Use 3.14 for π.

10 in.

2. A gazing ball in the center of a garden has a volume of 904.3 cm^3. To the nearest centimeter, find the diameter of the gazing ball.

3. To the nearest tenth of a cubic foot, find the volume of a 9 ft diameter inflatable ball.

Do you UNDERSTAND?

4. Writing The height and diameter of a cylinder is equal to the diameter of a sphere. Explain the relationship between the volume of the sphere and the volume of the cylinder.

5. Reasoning A ball of twine has a diameter of 3.4 m. More twine is added until the diameter is 12 m. A classmate subtracts the diameters and uses the result to find the change in volume of the sphere. Is he correct? Explain.
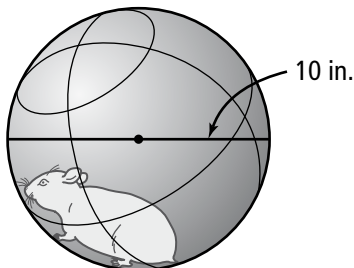
Close and Check

Do you know HOW?

1. To the nearest cubic inch, how much space is there inside the ball for the hamster? Use 3.14 for π.

10 in.

523.3 in.^{3}

2. A gazing ball in the center of a garden has a volume of 904.3 cm^3. To the nearest centimeter, find the diameter of the gazing ball.

12 cm

3. To the nearest tenth of a cubic foot, find the volume of a 9 ft diameter inflatable ball.

381.5 ft^3

SAMPLE SOLUTIONS ARE SHOWN BELOW.

Do you UNDERSTAND?

4. Writing The height and diameter of a cylinder is equal to the diameter of a sphere. Explain the relationship between the volume of the sphere and the volume of the cylinder.

The volume of the cylinder is $1\frac{1}{2}$ times greater than the volume of the sphere.

5. Reasoning A ball of twine has a diameter of 3.4 m. More twine is added until the diameter is 12 m. A classmate subtracts the diameters and uses the result to find the change in volume of the sphere. Is he correct? Explain.
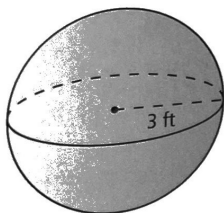
No. If you subtract the diameters, the radius is not the actual size of the ball. You have to find the volume of both balls of twine and subtract.
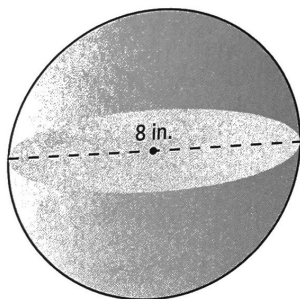
1. A solid plastic ball is a sphere with radius 8 in. How much plastic does it take to make one ball? Use 3.14 for π. Round to the nearest hundredth as needed.

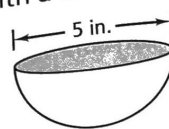**2.** Find the volume of the sphere to the nearest cubic foot. Use 3.14 for π.

3 ft

3. Find the volume of the figure. Use 3.14 as the value of π. Round to the nearest whole number.

8 in.

4. A spherical boulder is 20 ft in diameter and weighs almost 8 tons. Find the volume. Use 3.14 for π. Round to the nearest whole number as needed.

5. A sphere has a diameter of 0.968 inches.

  a. What is the volume of the sphere?

  b. How does the volume of this sphere compare to the volume of a sphere with radius 0.968 inches? Use 3.14 for π.

6. The volume of a rubber ball is $5{,}461\frac{1}{3}\pi$ cm³. What is the radius of the ball?

7. The volume of a sphere is 7,234.56 cm³. To the nearest centimeter, what is the radius of the sphere? Use 3.14 for π.

8. The volume of a soap bubble is 1,375.4 mm³. Find the radius and diameter of the soap bubble. Use 3.14 for π.

9. Think About the Process A bowl is in the shape of a hemisphere (half a sphere) with a diameter of 5 in.

|← 5 in. →|

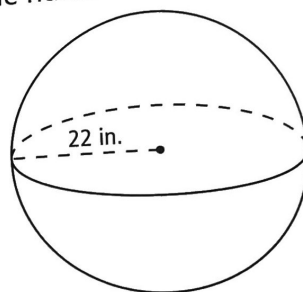 **a.** How can you find the radius if you know the diameter of the sphere?

   A. $d = 2\pi r$

   B. $d = 2r$

   C. $r = 2d$

   D. $r = \pi d$

  b. Find the volume of the bowl. Use 3.14 for π and round to the nearest whole number as needed.

10.

22 in.

  a. Writing What is the volume of the sphere? Use 3.14 for π. Round to the nearest hundredth as needed.

  b. Describe how the volume of the sphere changes if the radius is increased by 1.

11. a. Reasoning The volume of a sphere is 356.64 in.³. To the nearest tenth, what is the radius of the sphere? Use 3.14 for π.

  b. How can you check that your answer is correct? Explain.

12. E