LESSON MAKER PRO

Volume Power Lab

Find exact volumes of curved solids.

GRADE 8 · 8.GSR.8.4

8.GSR.8.4 "Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve in relevant problems."

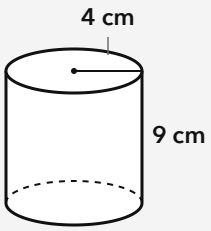
NAME _____ DATE _____

VOLUME FORMULAS

Use $V = \pi r^2 h$ for a cylinder, $V = 1/3\pi r^2 h$ for a cone, and $V = 4/3\pi r^3$ for a sphere. In each formula, r is the radius and h is the height. Leave answers in terms of π.

WORKED EXAMPLE

Find the volume of the cylinder shown. Leave your answer in terms of π.

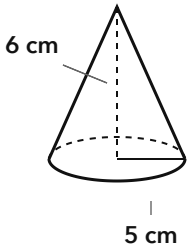


1. Use $V = \pi r^2 h$.
2. Substitute: $V = \pi(4)^2(9)$.
3. Multiply: $V = \pi(16)(9) = 144\pi$.

Answer: 144π cm^3

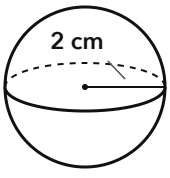
PRACTICE 6 problems

1 Find the volume of the cone shown. Leave your answer in terms of π.



ANSWER _____

2 Find the volume of the sphere shown. Leave your answer in terms of π.



ANSWER _____

3 A cylinder has a radius of 7 cm and a height of 2 cm. Find its volume in terms of π.

ANSWER _____

4 A cone has a radius of 3 cm and a height of 10 cm. Find its volume in terms of π.

ANSWER _____

5 A cylinder has a diameter of 12 cm and a height of 5 cm. Find its volume in terms of π.

ANSWER _____

6 A sphere has a diameter of 14 cm. Find its volume in terms of π.

ANSWER _____

APPLY IT Show your work

1 For a gaming club, Maya makes a cylindrical dice cup with an inside radius of 3 cm and an inside height of 12 cm. What is the cup's volume in terms of π?

WORK SPACE

ANSWER _____

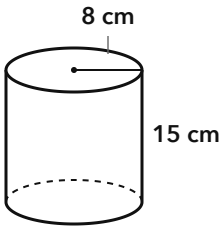
2 A small basketball display ball is modeled by a sphere with a radius of 6 cm. What is its volume in terms of π?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The cylinder shown is filled using identical cones that have the same radius and height as the cylinder. How many full cones are needed to fill the cylinder? Explain using volume.



WORK SPACE AND ANSWER

ANSWER KEY

Volume Power Lab

GRADE 8 · 8.GSR.8.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the cone shown. Leave your answer in terms of π.	**50π cm³**
2	Find the volume of the sphere shown. Leave your answer in terms of π.	**32π/3 cm³**
3	A cylinder has a radius of 7 cm and a height of 2 cm. Find its volume in terms of π.	**98π cm³**
4	A cone has a radius of 3 cm and a height of 10 cm. Find its volume in terms of π.	**30π cm³**
5	A cylinder has a diameter of 12 cm and a height of 5 cm. Find its volume in terms of π.	**180π cm³**
6	A sphere has a diameter of 14 cm. Find its volume in terms of π.	**1372π/3 cm³**

PART 2 · APPLY IT

1. **108π cm³** Use $V = \pi r^2 h$. Substitute 3 for r and 12 for h: $\pi(3)^2(12) = 108\pi$.
2. **288π cm³** Use $V = 4/3\pi r^3$. Substitute 6 for r: $4/3\pi(6)^3 = 288\pi$.

CHALLENGE

3 cones. The cylinder volume is 960π cm³, and each matching cone has volume 320π cm³. Since 960π ÷ 320π = 3, three cones fill the cylinder.

Accept equivalent exact forms, such as 32π/3 or (32/3)π. Require cubic units for volume answers.