LESSON MAKER PRO

Volume Power

Find the space inside cones, cylinders, and spheres.

GRADE 8 · NY-8.G.9

NY-8.G.9 "Given the formulas for the volume of cones, cylinders, and spheres, solve mathematical and real-world problems."

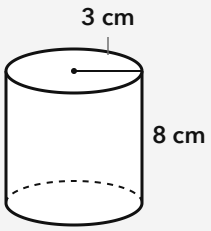
NAME _____ DATE _____

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. Make sure you use the radius, which is half of the diameter, and label volume in cubic units.

WORKED EXAMPLE

Find the volume of the cylinder shown.

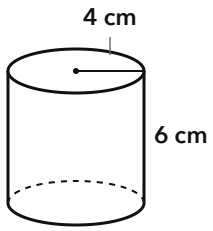


1. Use $V = \pi r^2 h$.
2. Substitute: $V = \pi(3)^2(8)$.
3. Calculate: $V = \pi(9)(8) = 72\pi$.

Answer: 72π cm^3

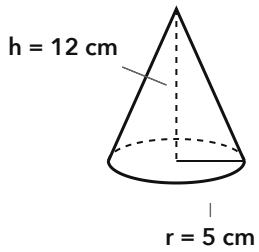
PRACTICE 6 problems

1 Find the volume of the cylinder shown.



ANSWER _____

2 Find the volume of the cone shown. Its radius is 5 cm and its perpendicular height (the dashed segment from the vertex to the base center) is 12 cm.



ANSWER _____

3 Find the volume of a sphere with a radius of 2 m.

ANSWER _____

4 A cylinder has a diameter of 10 in. and a height of 7 in. Find its volume.

ANSWER _____

5 A cone has a radius of 6 cm and a volume of 144π cm^3. Find its height.

ANSWER _____

6 Find the volume of a sphere with a radius of 9 yd.

ANSWER _____

APPLY IT Show your work

1 A Bluetooth speaker is shaped like a cylinder with a radius of 4 cm and a height of 10 cm. What is the volume of the speaker?

WORK SPACE

ANSWER _____

2 The gaming club orders a spherical trophy with a radius of 6 in. What is the volume of the trophy?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A cylindrical storage can has a radius of 5 cm and a height of 12 cm. A spherical container has a radius of 6 cm. Which container has the greater volume? Explain how much greater its volume is.

WORK SPACE AND ANSWER

Volume Power

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the cylinder shown.	**96π cm³**
2	Find the volume of the cone shown. Its radius is 5 cm and its perpendicular height (the dashed segment from the vertex to the base center) is 12 cm.	**100π cm³**
3	Find the volume of a sphere with a radius of 2 m.	**32/3π m³**
4	A cylinder has a diameter of 10 in. and a height of 7 in. Find its volume.	**175π in³**
5	A cone has a radius of 6 cm and a volume of 144π cm^3. Find its height.	**12 cm**
6	Find the volume of a sphere with a radius of 9 yd.	**972π yd³**

PART 2 · APPLY IT

1. **160π cm³** $V = \pi r^2 h = \pi(4)^2(10) = \pi(16)(10) = 160\pi$ cm^3, so the speaker's volume is 160π cm^3.
2. **288π in³** $V = 4/3\pi r^3 = 4/3\pi(6)^3 = 4/3\pi(216) = 288\pi$ in^3, so the trophy's volume is 288π in^3.

CHALLENGE

The cylinder has the greater volume. Its volume is 300π cm^3, and the sphere's volume is 288π cm^3, so the cylinder is greater by 12π cm^3.

Accept equivalent exact forms that include π and correct cubic units. For the challenge, accept a correct comparison supported by both volumes and the difference.