

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 _____

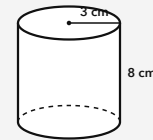
DATE _____

VOLUME FORMULAS

Use $V = \pi r^2 h$ for a cylinder, $V = \frac{1}{3}\pi r^2 h$ for a cone, and $V = \frac{4}{3}\pi r^3$ 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.

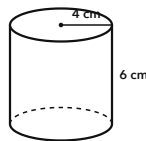


1. Use $V = \pi r^2 h$.
2. Substitute: $V = \pi(3)^2(8)$.
3. Calculate: $V = \pi(9)(8) = 72\pi$.

Answer: $72\pi \text{ cm}^3$

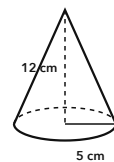
PRACTICE 6 problems

- 1** Find the volume of the cylinder shown.



ANSWER _____

- 2** Find the volume of the cone shown.



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 $144\pi \text{ cm}^3$. 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

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the cylinder shown.	$96\pi \text{ cm}^3$
2	Find the volume of the cone shown.	$100\pi \text{ cm}^3$
3	Find the volume of a sphere with a radius of 2 m.	$32/3\pi \text{ m}^3$
4	A cylinder has a diameter of 10 in. and a height of 7 in. Find its volume.	$175\pi \text{ in}^3$
5	A cone has a radius of 6 cm and a volume of $144\pi \text{ cm}^3$. Find its height.	12 cm
6	Find the volume of a sphere with a radius of 9 yd.	$972\pi \text{ yd}^3$

PART 2 • APPLY IT

- $160\pi \text{ cm}^3$ $V = \pi r^2 h = \pi(4)^2(10) = \pi(16)(10) = 160\pi \text{ cm}^3$, so the speaker's volume is $160\pi \text{ cm}^3$.
- $288\pi \text{ in}^3$ $V = 4/3\pi r^3 = 4/3\pi(6)^3 = 4/3\pi(216) = 288\pi \text{ in}^3$, so the trophy's volume is $288\pi \text{ in}^3$.

CHALLENGE

The cylinder has the greater volume. Its volume is $300\pi \text{ cm}^3$, and the sphere's volume is $288\pi \text{ cm}^3$, so the cylinder is greater by $12\pi \text{ cm}^3$.

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.