

Volume Vault

Find exact volumes with π .

GRADE 8 • 8.G.C.9

CCSS.Math.Content.8.G.C.9 "Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems."

NAME _____

DATE _____

VOLUME FORMULAS

Use $V = \pi \times r^2 \times h$ for a cylinder, $V = \frac{1}{3} \times \pi \times r^2 \times h$ for a cone, and $V = \frac{4}{3} \times \pi \times r^3$ for a sphere. If you are given a diameter, divide it by 2 to find the radius. Write volume in cubic units.

WORKED EXAMPLE

Find the volume of a cone with radius 2 cm and height 15 cm.

1. Use $V = \frac{1}{3} \times \pi \times r^2 \times h$.
2. Substitute: $V = \frac{1}{3} \times \pi \times 2^2 \times 15$.
3. Simplify: $V = 20\pi \text{ cm}^3$.

Answer: $20\pi \text{ cm}^3$

PRACTICE 6 problems

- 1** Find the volume of a cylinder with radius 5 cm and height 6 cm.

ANSWER _____

- 2** Find the volume of a cone with radius 4 cm and height 9 cm.

ANSWER _____

- 3** Find the volume of a sphere with radius 6 cm.

ANSWER _____

- 4** Find the volume of a cylinder with diameter 14 cm and height 10 cm.

ANSWER _____

- 5** Find the volume of a cone with diameter 12 cm and height 5 cm.

ANSWER _____

- 6** Find the volume of a sphere with diameter 18 cm.

ANSWER _____

APPLY IT Show your work

- 1** A gaming club uses a cylindrical drink dispenser with an inside radius of 7 cm and a height of 11 cm. How much liquid can the dispenser hold?

WORK SPACE

ANSWER _____

- 2** A snow-cone cup has an inside shape of a cone with radius 5 cm and perpendicular height 12 cm. How much shaved ice can the cup hold?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A capsule-shaped storage tube has a cylindrical middle and two hemispherical ends. The middle has radius 6 cm and height 14 cm. Each hemispherical end has radius 6 cm. Find the total volume of the tube.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of a cylinder with radius 5 cm and height 6 cm.	150pi cm³
2	Find the volume of a cone with radius 4 cm and height 9 cm.	48pi cm³
3	Find the volume of a sphere with radius 6 cm.	288pi cm³
4	Find the volume of a cylinder with diameter 14 cm and height 10 cm.	490pi cm³
5	Find the volume of a cone with diameter 12 cm and height 5 cm.	60pi cm³
6	Find the volume of a sphere with diameter 18 cm.	972pi cm³

PART 2 • APPLY IT

- 539pi cm³** Use the cylinder formula with $r = 7$ and $h = 11$. $V = \pi \times 7^2 \times 11 = 539\pi \text{ cm}^3$.
- 100pi cm³** Use the cone formula with $r = 5$ and $h = 12$. $V = \frac{1}{3} \times \pi \times 5^2 \times 12 = 100\pi \text{ cm}^3$.

CHALLENGE

792pi cm³

Accept exact equivalent expressions in terms of π . For items with a diameter, students must use half the diameter as the radius.