

Volume Builders

Find the space inside solid figures.

HIGH SCHOOL • MA.912.GR.4.5

MA.912.GR.4.5 "Solve mathematical and real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres."

NAME _____

DATE _____

VOLUME RULES

For a prism or cylinder, multiply the area of the base by the height. For a pyramid or cone, multiply the base area by the height, then divide by 3. For a sphere, use $V = \frac{4}{3} \pi r^3$.

WORKED EXAMPLE

Find the volume of a cone with radius 2 units and height 9 units. Write the answer in terms of π .

1. Base area = $\pi(2)^2 = 4\pi$.
2. $V = \frac{1}{3}(4\pi)(9)$.
3. $V = 12\pi$ cubic units.

Answer: 12 π cubic units

PRACTICE 6 problems

- 1** Find the volume of a cylinder with radius 5 units and height 6 units. Write the answer in terms of π .

ANSWER _____

- 2** Find the volume of a rectangular prism with length 8 units, width 3 units, and height 4 units.

ANSWER _____

- 3** A triangular prism has a triangular base with base 10 units and triangle height 6 units. The prism length is 7 units. Find its volume.

ANSWER _____

- 4** Find the volume of a square pyramid with base side length 15 units and vertical height 8 units.

ANSWER _____

- 5** Find the volume of a cone with radius 4 units and height 18 units. Write the answer in terms of π .

ANSWER _____

- 6** Find the volume of a sphere with radius 6 units. Write the answer in terms of π .

ANSWER _____

APPLY IT Show your work

- 1** The robotics team stores water in a cylindrical container with a radius of 7 cm and a height of 20 cm. What is the container's volume in terms of π ?

WORK SPACE

ANSWER _____

- 2** An art club pours resin into a rectangular-prism mold that is 11 cm long, 5 cm wide, and 8 cm deep. How much resin fills the mold?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A trophy is made from a cylinder with radius 6 units and height 10 units. A cone with the same radius and height 15 units sits on top of the cylinder. Find the trophy's total volume in terms of π .

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of a cylinder with radius 5 units and height 6 units. Write the answer in terms of pi.	150pi cubic units
2	Find the volume of a rectangular prism with length 8 units, width 3 units, and height 4 units.	96 cubic units
3	A triangular prism has a triangular base with base 10 units and triangle height 6 units. The prism length is 7 units. Find its volume.	210 cubic units
4	Find the volume of a square pyramid with base side length 15 units and vertical height 8 units.	600 cubic units
5	Find the volume of a cone with radius 4 units and height 18 units. Write the answer in terms of pi.	96pi cubic units
6	Find the volume of a sphere with radius 6 units. Write the answer in terms of pi.	288pi cubic units

PART 2 • APPLY IT

- 980pi cubic cm** Use $V = \pi r^2 h$. Substitute 7 for the radius and 20 for the height: $\pi(7)^2(20) = 980\pi$.
- 440 cubic cm** Multiply the three dimensions: $11 \times 5 \times 8 = 440$.

CHALLENGE

540pi cubic units

Accept equivalent exact forms, such as $(4/3)\pi(6)^3$ for the sphere, if they simplify to the stated answer. Require cubic units and pi answers to remain exact.