LESSON MAKER PRO

Volume Power Pack

Find exact volumes of common three-dimensional 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."

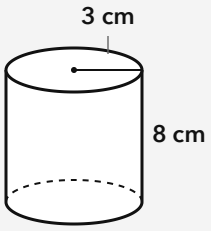
NAME _____ DATE _____

VOLUME RULES

For a prism or cylinder, multiply the area of the base by the height: $V = Bh$. For a pyramid or cone, use one-third of the base-area-times-height product: $V = (1/3)Bh$. For a sphere, use $V = (4/3)\pi r^3$, and use the radius, not the diameter.

WORKED EXAMPLE

Find the volume of the cylinder shown.

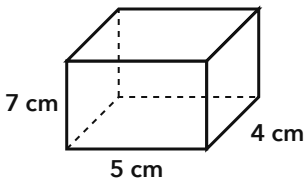


1. Use $V = \pi r^2 h$.
2. Substitute: $V = \pi(3)^2(8)$.
3. Simplify: $V = \pi(9)(8) = 72\pi$.

Answer: 72π cm^3

PRACTICE 6 problems

1 Find the volume of the rectangular prism shown.

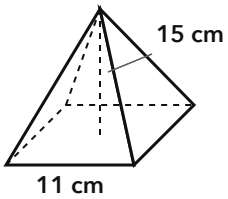


ANSWER _____

2 Find the volume of a cone with radius 6 cm and height 9 cm. Leave your answer in terms of π.

ANSWER _____

3 The figure shows a square pyramid with base side 11 cm and perpendicular height 15 cm. Find its volume.



ANSWER _____

4 Find the volume of a sphere with radius 4 cm. Leave your answer in terms of π.

ANSWER _____

5 A triangular prism has a triangular base with base 14 cm and altitude 10 cm. The prism length is 9 cm. Find its volume.

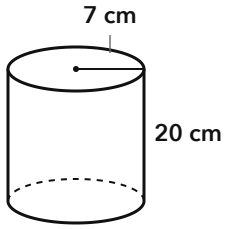
ANSWER _____

6 A cylinder has diameter 18 cm and height 5 cm. Find its volume in terms of π.

ANSWER _____

APPLY IT Show your work

1 A reusable water bottle has the cylindrical interior shown. Find its capacity in cubic centimeters, in terms of π.



ANSWER _____

2 A student ships a custom keyboard in a rectangular-prism box with inside dimensions 24 in. by 11 in. by 6 in. What is the volume of space inside the box?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A decorative trophy is made from a cylinder with radius 5 cm and height 10 cm. A cone with the same radius and height 6 cm is placed on top. Find the total volume of the trophy in terms of π.

WORK SPACE AND ANSWER

Volume Power Pack

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the rectangular prism shown.	**140 cm³**
2	Find the volume of a cone with radius 6 cm and height 9 cm. Leave your answer in terms of π.	**108π cm³**
3	The figure shows a square pyramid with base side 11 cm and perpendicular height 15 cm. Find its volume.	**605 cm³**
4	Find the volume of a sphere with radius 4 cm. Leave your answer in terms of π.	**256π/3 cm³**
5	A triangular prism has a triangular base with base 14 cm and altitude 10 cm. The prism length is 9 cm. Find its volume.	**630 cm³**
6	A cylinder has diameter 18 cm and height 5 cm. Find its volume in terms of π.	**405π cm³**

PART 2 · APPLY IT

1. **980π cm³** Use $V = \pi r^2 h$. Substitute the radius and height: $\pi(7)^2(20) = 980\pi$.
2. **1,584 in.³** Multiply the three dimensions of the rectangular prism: $24 \times 11 \times 6 = 1{,}584$.

CHALLENGE

300π cm³

Accept equivalent exact forms using π. For the challenge, the cylinder volume is 250π cm³ and the cone volume is 50π cm³.