LESSON MAKER PRO

Volume Vault

Find exact volumes with pi.

GRADE 8 · 8.G.C

CCSS.Math.Content.8.G.C "Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres."

NAME _____ DATE _____

VOLUME RULES

For a cylinder, multiply pi x radius squared x height. For a cone, take 1/3 of that product, and for a sphere use 4/3 x pi x radius cubed. If you are given a diameter, divide it by 2 to find the radius, and write volume in cubic units.

WORKED EXAMPLE

Find the volume of a cylinder with radius 2 cm and height 11 cm.

1. Use V = pi r^2h.
2. V = pi(2^2)(11).
3. V = pi(4)(11) = 44pi.

Answer: 44pi cm^3

PRACTICE 6 problems

1 Find the volume of a cylinder with radius 3 cm and height 5 cm.

ANSWER _____

2 Find the volume of a cone with radius 6 cm and height 8 cm.

ANSWER _____

3 Find the volume of a sphere with radius 3 cm.

ANSWER _____

4 Find the volume of a cylinder with diameter 10 cm and height 6 cm.

ANSWER _____

5 Find the volume of a cone with diameter 12 cm and height 9 cm.

ANSWER _____

6 Find the volume of a sphere with radius 5 cm.

ANSWER _____

APPLY IT Show your work

1 The robotics club is making 5 identical cone-shaped resin trophy tops. Each top has a radius of 3 cm and a height of 12 cm. What total volume of resin is needed?

WORK SPACE

ANSWER _____

2 A refillable water bottle has a cylindrical space inside with radius 5 cm and height 12 cm. What is the bottle's capacity in cubic centimeters?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A custom container is made from a cylinder with a hemispherical cap on top. Both parts have radius 6 cm, and the cylinder is 10 cm tall. What is the total volume of the container?

_____

_____

ANSWER KEY

Volume Vault

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of a cylinder with radius 3 cm and height 5 cm.	**45pi cm^3**
2	Find the volume of a cone with radius 6 cm and height 8 cm.	**96pi cm^3**
3	Find the volume of a sphere with radius 3 cm.	**36pi cm^3**
4	Find the volume of a cylinder with diameter 10 cm and height 6 cm.	**150pi cm^3**
5	Find the volume of a cone with diameter 12 cm and height 9 cm.	**108pi cm^3**
6	Find the volume of a sphere with radius 5 cm.	**500pi/3 cm^3**

PART 2 · APPLY IT

1. **180pi cm^3** One cone has volume 1/3 x pi x 3^2 x 12 = 36pi cm^3. Multiply 36pi by 5 trophy tops.
2. **300pi cm^3** Use V = pi r^2h. Substitute the radius and height: pi x 5^2 x 12 = 300pi.

CHALLENGE

504pi cm^3

Accept equivalent exact forms, such as (500pi)/3 cm^3. For the challenge, accept work that adds 360pi cm^3 for the cylinder and 144pi cm^3 for the hemisphere.