LESSON MAKER PRO

Volume Vault

Find exact volumes of familiar 3D solids.

HIGH SCHOOL · HSG-GMD.A.3

CCSS.Math.Content.HSG-GMD.A.3 "Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. *"

NAME _____ DATE _____

VOLUME FORMULAS

Use V = pi r^2h for a cylinder, V = (1/3)pi r^2h for a cone, V = (1/3)Bh for a pyramid, and V = (4/3)pi r^3 for a sphere. In a pyramid formula, B is the area of the base. Keep pi in your answer unless a decimal is requested.

WORKED EXAMPLE

Find the volume of a cylinder with radius 4 cm and height 7 cm.

1. V = pi r^2h
2. V = pi(4)^2(7)
3. V = 112pi cm^3

Answer: 112pi cm^3

PRACTICE 6 problems

1 Find the volume of a cylinder with radius 2 cm and height 9 cm.

ANSWER _____

2 Find the volume of a cone with radius 6 cm and height 12 cm.

ANSWER _____

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

ANSWER _____

4 Find the volume of a square pyramid with base side length 10 m and height 15 m.

ANSWER _____

5 Find the volume of a rectangular pyramid with a base that is 8 in. by 5 in. and a height of 6 in.

ANSWER _____

6 A cone has radius 9 cm and volume 162pi cm^3. Find its height.

ANSWER _____

APPLY IT Show your work

1 A student designs a cylindrical water bottle with an inside radius of 6 cm and a height of 10 cm. What is the bottle's capacity in cubic centimeters, in terms of pi?

WORK SPACE

ANSWER _____

2 A school fundraiser serves shaved ice in cone-shaped cups with radius 6 cm and height 15 cm. What is the capacity of one cup, in terms of pi?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A model rocket has a cylindrical body with radius 6 cm and height 10 cm. Its nose is a cone with the same radius and a height of 9 cm. Find the total volume of the rocket, in terms of pi.

_____

_____

ANSWER KEY

Volume Vault

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of a cylinder with radius 2 cm and height 9 cm.	**36pi cm^3**
2	Find the volume of a cone with radius 6 cm and height 12 cm.	**144pi cm^3**
3	Find the volume of a sphere with radius 3 cm.	**36pi cm^3**
4	Find the volume of a square pyramid with base side length 10 m and height 15 m.	**500 m^3**
5	Find the volume of a rectangular pyramid with a base that is 8 in. by 5 in. and a height of 6 in.	**80 in.^3**
6	A cone has radius 9 cm and volume 162pi cm^3. Find its height.	**6 cm**

PART 2 · APPLY IT

1. **360pi cm^3** Use V = pi r^2h. Substitute 6 for r and 10 for h: pi(6)^2(10) = 360pi cm^3.
2. **180pi cm^3** Use V = (1/3)pi r^2h. Substitute 6 for r and 15 for h: (1/3)pi(6)^2(15) = 180pi cm^3.

CHALLENGE

468pi cm^3

Accept equivalent exact forms that include pi and correct cubic units. For the challenge, students should add the cylinder volume, 360pi cm^3, and the cone volume, 108pi cm^3.