

Cylinder Volume Lab

Build volume from a circular base and a height.

GRADE 7 • 7.MG.1.a

7.MG.1.a “Develop the formulas for determining the volume of right cylinders and solve problems, including those in contextual situations, using concrete objects, diagrams, and formulas.”

NAME _____

DATE _____

STACK THE BASES

A right cylinder is like a stack of equal circular layers. Find the area of one base with πr^2 , then multiply by the height: $V = \pi r^2 h$.

WORKED EXAMPLE

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

1. Base area = $\pi(5)^2 = 25\pi \text{ cm}^2$.

2. $V = \text{base area times height}$.

3. $V = 25\pi(3) = 75\pi \text{ cm}^3$.

Answer: $75\pi \text{ cm}^3$

PRACTICE 6 problems

- 1** Find the volume of a right cylinder with radius 2 cm and height 4 cm.

ANSWER _____

- 2** Find the volume of a right cylinder with diameter 12 cm and height 7 cm.

ANSWER _____

- 3** A right cylinder has a base area of $36\pi \text{ cm}^2$ and a height of 2 cm. Find its volume.

ANSWER _____

- 4** Find the volume of a right cylinder with radius 4 cm and height 9 cm.

ANSWER _____

- 5** Find the volume of a right cylinder with radius 8 cm and height 1 cm.

ANSWER _____

- 6** Find the volume of a right cylinder with diameter 14 cm and height 6 cm.

ANSWER _____

APPLY IT Show your work

- 1** An art club stores paint in a cylindrical container with a radius of 7 cm and a height of 8 cm. What is the container's volume in terms of pi?

WORK SPACE

ANSWER _____

- 2** A cylindrical snack can has a diameter of 18 cm and a height of 11 cm. What is the volume of the can in terms of pi?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A right cylinder has a volume of $800\pi \text{ cm}^3$ and a height of 8 cm. Find its radius. Explain your reasoning with an equation.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of a right cylinder with radius 2 cm and height 4 cm.	$16\pi \text{ cm}^3$
2	Find the volume of a right cylinder with diameter 12 cm and height 7 cm.	$252\pi \text{ cm}^3$
3	A right cylinder has a base area of $36\pi \text{ cm}^2$ and a height of 2 cm. Find its volume.	$72\pi \text{ cm}^3$
4	Find the volume of a right cylinder with radius 4 cm and height 9 cm.	$144\pi \text{ cm}^3$
5	Find the volume of a right cylinder with radius 8 cm and height 1 cm.	$64\pi \text{ cm}^3$
6	Find the volume of a right cylinder with diameter 14 cm and height 6 cm.	$294\pi \text{ cm}^3$

PART 2 • APPLY IT

- $392\pi \text{ cm}^3$** Use $V = \pi r^2 h$. Substitute $r = 7$ and $h = 8$: $V = \pi(7)^2(8) = 392\pi \text{ cm}^3$.
- $891\pi \text{ cm}^3$** The radius is half the diameter, so $r = 9$ cm. Use $V = \pi(9)^2(11) = 891\pi \text{ cm}^3$.

CHALLENGE

$r = 10$ cm. Using $800\pi = \pi r^2(8)$, divide by 8π to get $r^2 = 100$. The positive radius is 10 cm.

Accept equivalent exact forms such as $16 \times \pi \text{ cm}^3$. Require cubic units for volume and a positive value for the radius in the challenge.