

Pyramid Volume Power

Compare prisms and pyramids with matching bases and heights.

GRADE 7 • TEKS 7.8

7.8 "Expressions, equations, and relationships. The student applies mathematical process standards to develop geometric relationships with volume..."

NAME _____

DATE _____

ONE-THIRD RULE

When a prism and a pyramid have the same base area, B , and height, h , the pyramid has one-third the volume of the prism. Use $V = Bh$ for a prism and $V = Bh/3$ for a pyramid, whether the base is rectangular or triangular.

WORKED EXAMPLE

A rectangular prism has a base area of 30 cm^2 and a height of 9 cm . A rectangular pyramid has the same base and height. Find the pyramid's volume.

1. Find the prism volume: $30 \times 9 = 270 \text{ cm}^3$.
2. Take one-third: $270 / 3 = 90 \text{ cm}^3$.

Answer: 90 cm^3

PRACTICE 5 problems

- 1** A rectangular pyramid has a base area of 24 cm^2 and a height of 5 cm . Find its volume.

ANSWER _____

- 2** A triangular pyramid has a base area of 18 cm^2 and a height of 7 cm . Find its volume.

ANSWER _____

- 3** A triangular pyramid has a volume of 36 cm^3 . A triangular prism has the same base and height. Find the prism's volume.

ANSWER _____

- 4** A rectangular pyramid has a base that is 8 cm by 3 cm and a height of 6 cm . Find its volume.

ANSWER _____

- 5** A triangular prism has a volume of 96 cm^3 . A triangular pyramid has the same base and height. Find the pyramid's volume.

ANSWER _____

APPLY IT Show your work

- 1** The art club makes a triangular pyramid trophy. Its triangular base has an area of 28 in^2 , and the trophy is 6 in high. What is the trophy's volume?

WORK SPACE

ANSWER _____

- 2** A gaming club designs a pyramid display with the same base and height as a rectangular box that is 12 cm long, 4 cm wide, and 5 cm high. What is the display's volume?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A pyramid has a volume of 84 cm^3 and a height of 7 cm. Find its base area. Show an equation.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A rectangular pyramid has a base area of 24 cm^2 and a height of 5 cm. Find its volume.	40 cm^3
2	A triangular pyramid has a base area of 18 cm^2 and a height of 7 cm. Find its volume.	42 cm^3
3	A triangular pyramid has a volume of 36 cm^3 . A triangular prism has the same base and height. Find the prism's volume.	108 cm^3
4	A rectangular pyramid has a base that is 8 cm by 3 cm and a height of 6 cm. Find its volume.	48 cm^3
5	A triangular prism has a volume of 96 cm^3 . A triangular pyramid has the same base and height. Find the pyramid's volume.	32 cm^3

PART 2 • APPLY IT

1. **56 in^3** Use $V = Bh/3$. Compute $28 \times 6 / 3 = 56$.
2. **80 cm^3** The box volume is $12 \times 4 \times 5 = 240 \text{ cm}^3$. The pyramid is one-third of 240 cm^3 .

CHALLENGE

$(1/3) \times B \times 7 = 84; B = 36 \text{ cm}^2$

Accept $V = Bh/3$, $(1/3)Bh$, or $B h / 3$ as equivalent formulas. Require cubic units for volume and square units for base area.