LESSON MAKER PRO

Prism Pyramid Power

Compare volumes with the same base and height.

GRADE 7 · TEKS 7.8.B

7.8.B "explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas; and"

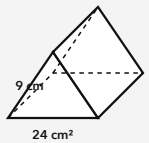
NAME _____ DATE _____

ONE-THIRD VOLUME

When a triangular prism and triangular pyramid have congruent bases and equal heights, the prism has 3 times the volume of the pyramid. Use $V_{prism} = Bh$ and $V_{pyramid} = 1/3Bh$, where B is base area and h is height.

WORKED EXAMPLE

The triangular prism shown and a triangular pyramid have congruent bases and equal heights. Find both volumes.



1. Prism: V = Bh = 24 × 9 = 216 cm³.
2. Pyramid: V = 1/3Bh = 1/3(24 × 9) = 72 cm³.
3. The prism volume is 3 times the pyramid volume.

Answer: Prism: 216 cm³; pyramid: 72 cm³

PRACTICE 4 problems

1 A triangular pyramid and triangular prism have B = 15 cm² and h = 8 cm. Find the pyramid volume.

ANSWER _____

2 A triangular pyramid has volume 30 cm³. A triangular prism has a congruent base and equal height. Find the prism volume.

ANSWER _____

3 A triangular prism and triangular pyramid have B = 18 cm² and h = 7 cm. Find both volumes.

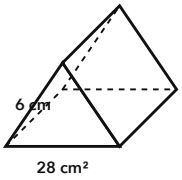
ANSWER _____

4 A triangular prism has volume x cm³. Write the volume of a matching triangular pyramid in terms of x. Then state the relationship.

ANSWER _____

APPLY IT Show your work

1 The esports club's triangular-prism light display is shown. A matching triangular-pyramid trophy has a congruent base and equal height. What is the total volume of both objects?



ANSWER _____

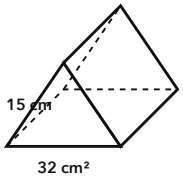
2 A 3-D printing club fills a triangular-pyramid game-token mold with 54 cm³ of resin. Its triangular-prism storage case has a congruent base and equal height. How much more volume does the case hold?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The triangular prism shown and a triangular pyramid have congruent bases and equal heights. A student says the pyramid has half the prism's volume. Find both volumes and use the formulas to correct the student.



WORK SPACE AND ANSWER

ANSWER KEY

Prism Pyramid Power

GRADE 7 · TEKS 7.8.B

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A triangular pyramid and triangular prism have B = 15 cm² and h = 8 cm. Find the pyramid volume.	**40 cm³**
2	A triangular pyramid has volume 30 cm³. A triangular prism has a congruent base and equal height. Find the prism volume.	**90 cm³**
3	A triangular prism and triangular pyramid have B = 18 cm² and h = 7 cm. Find both volumes.	**Prism: 126 cm³; pyramid: 42 cm³**
4	A triangular prism has volume x cm³. Write the volume of a matching triangular pyramid in terms of x. Then state the relationship.	**x/3 cm³; the prism volume is 3 times the pyramid volume.**

PART 2 · APPLY IT

1. **224 cm³** The prism volume is 28 × 6 = 168 cm³. The pyramid volume is 168/3 = 56 cm³, so the total is 224 cm³.
2. **108 cm³** The prism holds 3 × 54 = 162 cm³. The difference is 162 - 54 = 108 cm³.

CHALLENGE

Prism: 480 cm³; pyramid: 160 cm³. $V_{pyramid}$ = 1/3Bh, so the pyramid has one-third, not one-half, of the prism's volume.

Accept equivalent forms such as $V_{pyramid} = V_{prism}/3$. Students should state that the bases are congruent and the heights are equal when explaining the 3-to-1 relationship.