

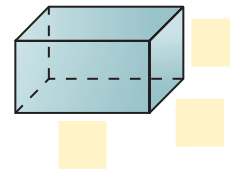
11-5

Volumes of Pyramids
and Cones

Vocabulary

● Review

- Write L , W , or H to label the *length*, *width*, and *height* of the rectangular prism at the right.
- Explain how the *length*, *width*, and *height* of a cube are related.



Circle the correct statement in each exercise.

- The *width* of a cylinder is the radius of a base of the cylinder.
The *height* of a cylinder is the *length* of an altitude of the cylinder.
- The *height* of a pyramid is the length of a segment perpendicular to the base.
The slant *height* of a pyramid is the length of a segment perpendicular to the base.

● Vocabulary Builder

volume (noun) VAHL yoom

Related Word: capacity

Main Idea: **Volume** measures quantity of space or amount, such as loudness of sound or a collection of books.

Definition: **Volume** is the amount of space that a three-dimensional figure occupies, measured in cubic units.

Example: The **volume** of a bottle of juice is 2 liters.

● Use Your Vocabulary

Write T for *true* or F for *false*.

5. A synonym for *volume* is capacity.
6. *Volume* is measured in square units.
7. You can find the *volume* of a circle.

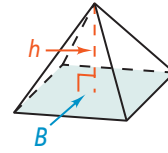
Take note

Theorem 11-8 Volume of a Pyramid

The volume of a pyramid is one third the product of the area of the base and the height of the pyramid.

8. Complete the formula for the volume of a pyramid.

$V = \square \cdot Bh$



Take note

Theorem 11-9 Volume of a Cone

The volume of a cone is one third the product of the area of the base and the height of the cone.

$V = \frac{1}{3} Bh$

9. Circle an equivalent formula for the volume of a cone.

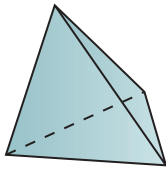
$V = \frac{1}{3} \pi r^2 h$

$V = \frac{1}{3} \cdot 2\pi r \cdot h$



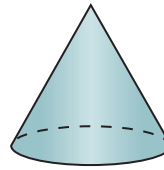
Write the formula for the volume of each figure below.

- 10.



$V = \frac{1}{3} \cdot \square \cdot \square$

- 11.



$V = \square$

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Problem 1 Finding Volume of a Pyramid

Got It? A sports arena shaped like a pyramid has a base area of about 300,000 ft² and a height of 321 ft. What is the approximate volume of the arena?

12. Complete the problem-solving model below.

<p>Know</p> <p>$B \approx \square$</p> <p>$h = \square$</p>	➔	<p>Need</p> <p>Volume of the pyramid</p>	➔	<p>Plan</p> <p>Substitute the given values into the formula</p> <p>\square.</p>
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13. Solve for V .

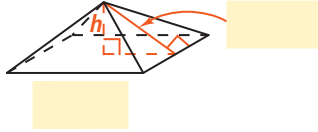
14. The approximate volume of the arena is \square ft³.



Problem 2 Finding the Volume of a Pyramid

Got It? What is the volume of a square pyramid with base edges 24 m and slant height 13 m?

15. Label the pyramid at the right.



16. Find the height of the pyramid.

$$13^2 = h^2 + \square^2$$

$$169 = h^2 + \square$$

$$h^2 = \square$$

$$h = \square$$

17. Find the area of the base.

$$B = \square \cdot \square$$

$$= \square$$

18. Find the volume of the pyramid.

$$V = \square \cdot Bh$$

$$= \square \cdot \square \cdot \square$$

$$= \square$$

19. The volume of the pyramid is $\square \text{ m}^3$.



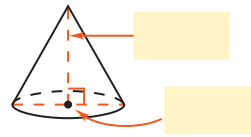
Problem 3 Finding the Volume of a Cone

Got It? A small child's teepee is 6 ft high with a base diameter of 7 ft. What is the volume of the child's teepee to the nearest cubic foot?

20. Label the cone at the right with the dimensions of the teepee.

21. The radius of the teepee is \square ft.

22. Use the justifications to find the volume of the teepee.



$$V = \square$$

Use the formula with π for the volume of a cone.

$$V = \square$$

Substitute for r and h .

$$= \square$$

Square the radius.

$$= \square$$

Simplify in terms of π .

$$\approx \square$$

Use a calculator.

23. The volume of the child's teepee to the nearest cubic foot is $\square \text{ ft}^3$.

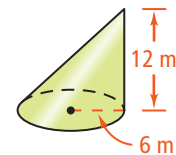


Problem 4 Finding the Volume of an Oblique Cone

Got It? What is the volume of the oblique cone at the right in terms of π and rounded to the nearest cubic meter?

24. The radius of the base is \square m and the height is \square m.

25. Cross out the formula that is NOT a formula for the volume of a cone.



$$V = \frac{1}{3}Bh$$

$$V = Bh$$

$$V = \frac{1}{3}\pi r^2 h$$

26. Find the volume of the cone.

27. The volume of the cone in terms of π is m^3 .

Rounded to the nearest cubic meter, the volume of the cone is m^3 .



Lesson Check • Do you UNDERSTAND?

Error Analysis A square pyramid has base edges 13 ft and height 10 ft. A cone has diameter 13 ft and height 10 ft. Your friend claims the figures have the same volume because the volume formulas for a pyramid and a cone are the same: $V = \frac{1}{3}Bh$. What is her error?

28. Is $V = \frac{1}{3}Bh$ the volume formula for both a pyramid and a cone?

Yes / No

Underline the correct word to complete each sentence.

29. The base of a square pyramid is a circle / polygon .

30. The base of a cone is a circle / polygon .

31. Circle the base used in the formula for the volume of a cone. Underline the base used in the formula for the volume of a square pyramid.

$B = \pi r^2$

$B = \frac{1}{2}bh$

$B = s^2$

32. Now explain your friend's error.



Math Success

Check off the vocabulary words that you understand.

pyramid

cone

oblique

volume

Rate how well you can *find the volumes of pyramids and cones*.

