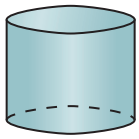
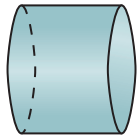
11-4 Volumes of Prisms and Cylinders

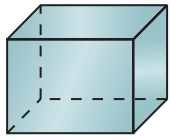
Vocabulary

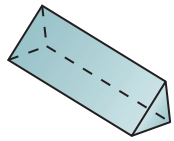
Review

Label each diagram *cylinder* or *prism*.

1. 

2. 

3. 

4. 

Vocabulary Builder

composite (adjective, noun) **kum** PAHZ **it**

Related Words: compound, combination, component

Definition: **Composite** means put together with distinct parts.

Main Idea: A **composite** is a whole made up of different parts.

Use Your Vocabulary

Complete each statement with the correct phrase from the list below. Use each phrase only once.

composite function *composite* map *composite* number *composite* sketch

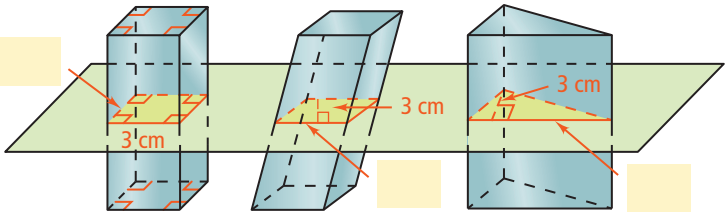
5. A _?_ combines different descriptions of features.
6. A _?_ has factors other than one and the number.
7. A _?_ shows the locations of shopping malls, houses, and roads in one illustration.
8. A _?_ shows how to apply at least one function to another function.

take note

Theorem 11-5 Cavalieri's Principle

If two space figures have the same height and the same cross-sectional area at every level, then they have the same volume.

9. The three prisms below have the same height and the same volume. The first is a square prism. Label the missing dimensions.



10. Circle the solid(s) that may have the same cross-sectional area at every level.

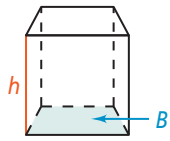
cone cylinder prism pyramid

take note

Theorem 11-6 Volume of a Prism

The volume of a prism is the product of the area of the base and the height of the prism.

$V = Bh$

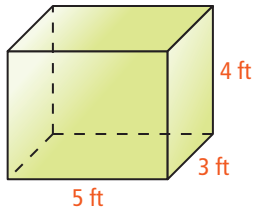


11. A prism with a base area of 15 m^2 and a height 4 m has a volume of ____ m^3.

12. A prism with a volume of 81 ft^3 and a height of 3 ft has a base area of ____ ft^2.

Problem 1 Finding the Volume of a Rectangular Prism

Got It? What is the volume of the rectangular prism at the right?



13. Circle the measurements of a base of the prism.

3 ft × 4 ft 3 ft × 5 ft 4 ft × 5 ft

14. Underline the correct word to complete the sentence.

The base is a rectangle / square .

15. Find B.

$B =$ ____ · ____

$=$ ____ · ____

$=$ ____

16. Find V.

$V =$ ____ · ____

$=$ ____ · ____

$=$ ____

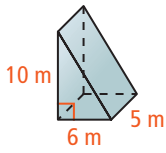
17. Underline the correct word to complete the sentence.

The units for this volume are cubic / square feet .

18. The volume of the prism is ____.

Problem 2 Finding the Volume of a Triangular Prism

Got It? What is the volume of the triangular prism at the right?



19. The base is a right triangle with legs of length ____ m and ____ m.

20. The height of the prism is ____ m.

21. Complete the formula for volume of a prism. $V =$ ____ $\cdot$ ____

22. Find the area of the base.

$A = \frac{1}{2} \cdot$ ____ $\cdot$ ____

$= \frac{1}{2} \cdot$ ____

$=$ ____

23. Find the volume of the prism.

$V =$ ____ $\cdot$ ____

$=$ ____

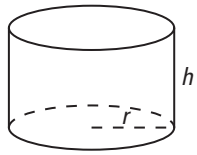
24. The volume of the triangular prism is ____ m^3.

take note

Theorem 11-7 Volume of a Cylinder

The volume of a cylinder is the product of the area of the base and the height of the cylinder.

$V = Bh$, or $V = \pi r^2 h$



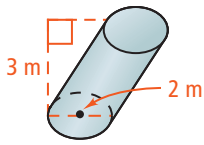
25. Shade a base of the cylinder at the right.

26. Describe the shape of the base.

_____

Problem 3 Finding the Volume of a Cylinder

Got It? What is the volume of the cylinder at the right in terms of π?



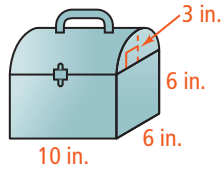
27. Compete the reasoning model below.

Think	Write
First I need to find the radius.	$r = \frac{\square}{2} = \square$
I can use the formula $V = \pi r^2 h$ and substitute for r and h.	$V = \pi \cdot \square^2 \cdot \square$
Now I simplify.	$V = \pi \cdot \square$

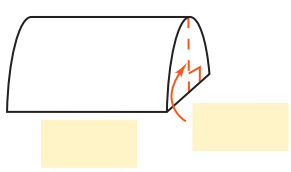
28. The volume of the cylinder is ____ m^3.

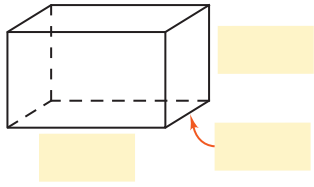
Problem 4 Finding Volume of a Composite Figure

Got It? **What is the approximate volume of the lunch box shown at the right? Round to the nearest cubic inch.**



29. The top and bottom of the lunch box are sketched below. Label the dimensions.





30. Find the volume of the top.

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

$= \frac{1}{2}\pi(\quad^2)(\quad)$

$=$

31. Find the volume of the bottom.

$V = Bh$

$= (\quad \cdot \quad)(\quad)$

$=$

32. Find the sum of the volumes.

$V = \quad \pi +$

$\approx$

33. The approximate volume of the lunch box is $\quad$ in.^{3}.

Lesson Check • Do you UNDERSTAND?

Reasoning **How is the volume of a rectangular prism with base 2 m by 3 m and height 4 m related to the volume of a rectangular prism with base 3 m by 4 m and height 2 m? Explain.**

34. Cross out the formula that does NOT give the volume of a rectangular prism.

$V = Bh$ $V = \pi r^2 h$ $V = \ell wh$

35. The Commutative / Identity Property of Multiplication states that the product of factors is the same when listed in a different order.

36. Now answer the question.

Math Success

Check off the vocabulary words that you understand.

☐ volume ☐ composite space figure

Rate how well you can *find the volume of prisms and cylinders.*

Need to review 0 2 4 6 8 10 Now I get it!