LESSON 12.4

NAME _____ DATE _____

Reteaching with Practice

For use with pages 743–749

GOAL **Use volume postulates and find the volume of prisms and cylinders**

VOCABULARY

The **volume of a solid** is the number of cubic units contained in its interior. Volume is measured in cubic units.

Postulate 27 Volume of a Cube The volume of a cube is the cube of the length of its side, or $V = s^3$.

Postulate 28 Volume Congruence Postulate If two polyhedra are congruent, then they have the same volume.

Postulate 29 Volume Addition Postulate The volume of a solid is the sum of the volumes of all its nonoverlapping parts.

Theorem 12.6 Cavalieri's Principle If two solids have the same height and the same cross-sectional area at every level, then they have the same volume.

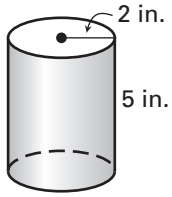
Theorem 12.7 Volume of a Prism The volume V of a prism is $V = Bh$, where B is the area of a base and h is the height.

Theorem 12.8 Volume of a Cylinder The volume V of a cylinder is $V = Bh = \pi r^2 h$, where B is the area of a base, h is the height, and r is the radius of a base.

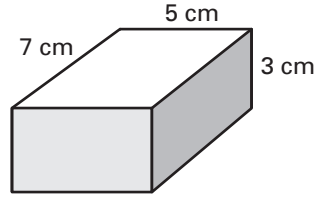
EXAMPLE 1 *Finding Volumes*

Find the volume of the right cylinder and the right prism.

a.



b.



SOLUTION

a. The area B of the base is $\pi \cdot 2^2$, or 4π in.^{2}. Use $h = 5$ to find the volume.

$$V = Bh = 4\pi(5) = 20\pi \approx 62.83 \text{ in.}^3$$

b. The area B of the base is $(7)(5)$, or 35 cm^2. Use $h = 3$ to find the volume.

$$V = Bh = (35)(3) = 105 \text{ cm}^3$$

Lesson 12.4

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LESSON 12.4 CONTINUED

NAME _____ DATE _____

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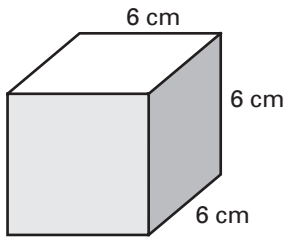
Exercises for Example 1

Find the volume of the right prism or the right cylinder.

1.



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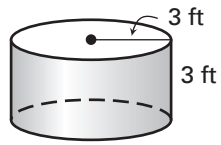

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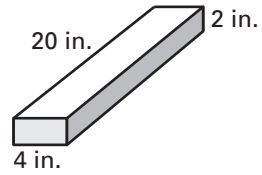
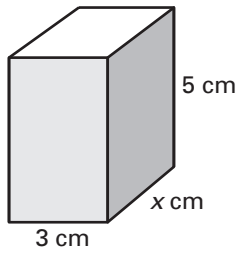


EXAMPLE 2 Using Volumes

Use the measurements given to solve for x.

$V = 60 \text{ cm}^3$



SOLUTION

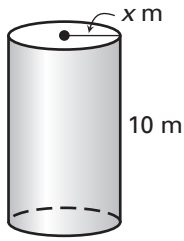
The area of the base is $3x$ square centimeters.

$V = Bh$	Formula for volume of a right prism
$60 = (3x)(5)$	Substitute.
$60 = 15x$	Rewrite.
$\frac{60}{15} = x$	Divide each side by 15.
$4 = x$	Simplify.

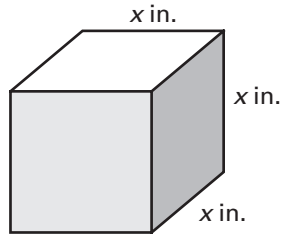
Exercises for Example 2

Use the measurements given to solve for *x*.

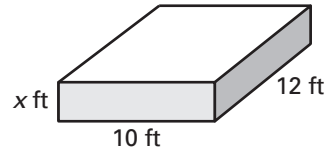
4. $V = 283 \text{ m}^3$



5. $V = 64 \text{ in.}^3$



6. $V = 300 \text{ ft}^3$



Lesson 12.4

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