

Lesson 10.1

TEKS

7.8A

7.9A

7.1C

Volume of Rectangular Prisms + Pyramids

Q: How do you find the volume of a rectangular prism and a rectangular pyramid?

A: Substitute the _____ into the _____ for Volume.

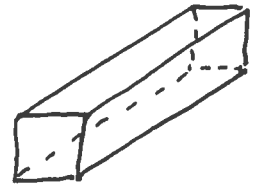
vocab

- 1.) Volume: _____
- 2.) Pyramid: _____

Formula for volume of a rectangular prism

$$\text{Area of base } B = l \times w$$

$$\text{Volume of } = V = Bh$$



What is a prism? A polyhedron that has 2 _____ polygon-shaped bases and other _____ that are _____ parallelograms.

What is a polyhedron? A _____ figure in which all surfaces or faces are polygons.

What is a polygon? A closed plane figure formed by _____ or more line segments that intersect only at their _____.

LESSON
10-1

Volume of Rectangular Prisms and Pyramids

Reading Strategies: Use a Visual Aid

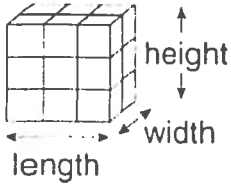
Think of the **volume** of a solid figure as the number of cubic units inside the figure.



one cubic unit

Use this rectangular prism to complete Exercises 1–4.

Each cube represents one cubic unit.



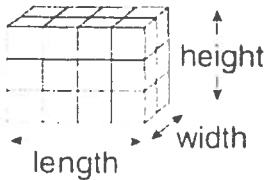
1. What is the length of this prism? length = _____
2. What is the width of the prism? width = _____
3. What is the height of the prism in the figure? height = _____

Multiply the length, width, and height of a prism to find its volume in cubic units.

$$\begin{array}{ccccccc}
 \text{Volume} & = & \text{length} & \cdot & \text{width} & \cdot & \text{height} \\
 \downarrow & & \downarrow & & \downarrow & & \downarrow \\
 V & = & l & \cdot & w & \cdot & h
 \end{array}$$

4. Multiply the length, width, and height of the prism above to find the volume. What is the volume? volume = _____

Use this rectangular prism to complete Exercises 5–7.



5. How long is the prism? How wide is the prism? length = _____
width = _____
6. What is the height of the prism? height = _____
7. Use the formula $V = l \cdot w \cdot h$ to find the volume of this prism. volume = _____

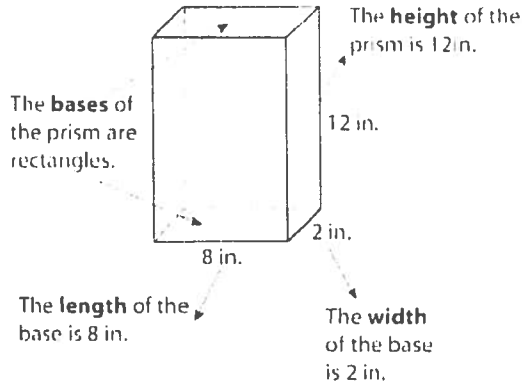
LESSON
10-1

Volume of Rectangular Prisms and Pyramids

Success for English Learners

Problem 1

Find the volume.

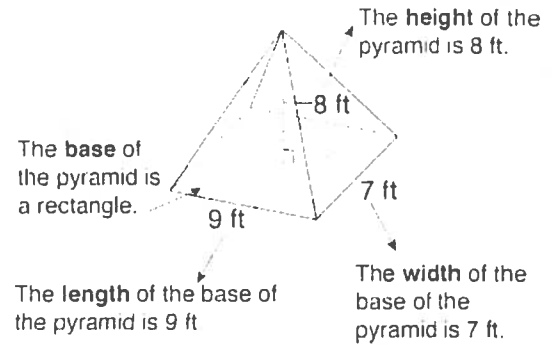


$$\begin{aligned}
 B &= lw && l = 8, w = 2 \\
 &= 8 \cdot 2 \\
 &= 16 \text{ in}^2 \\
 V &= Bh && B = 16, h = 12 \\
 &= 16 \cdot 12 \\
 &= 192 \text{ in}^3
 \end{aligned}$$

The volume is 192 in^3 .

Problem 2

Find the volume.



$$\begin{aligned}
 B &= lw && l = 9, w = 7 \\
 &= 9 \cdot 7 \\
 &= 63 \text{ ft}^2 \\
 V &= \frac{1}{3} Bh && B = 63, h = 8 \\
 &= \frac{1}{3} \cdot 63 \cdot 8 \\
 V &= 168 \text{ ft}^3
 \end{aligned}$$

The volume is 168 ft^3 .

1. Explain why the volume in Problem 1 is 192 in^3 instead of 192 inches.

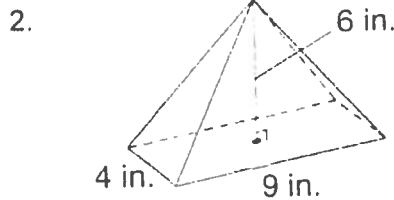
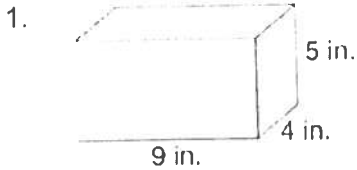
2. How do you find the volume of a pyramid if the base is a square?

LESSON
10-1

Volume of Rectangular Prisms and Pyramids

Practice and Problem Solving: D

Find the volume of each figure. Choose the letter for the best answer.
The first one is done for you.



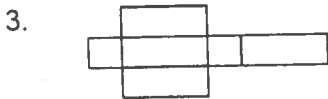
- A 18 in^3
B 54 in^3

C 180 in^3

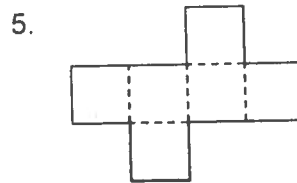
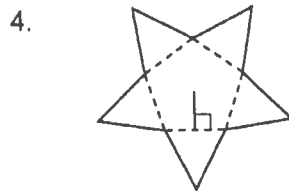
- F 19 in^3
G 72 in^3

H 216 in^3

Identify the three-dimensional shape that can be formed from each net.



rectangular prism



Solve. The first one is done for you.

6. The base of a square pyramid is 6 meters on each side. The pyramid has a height of 12 meters. What is the volume of the pyramid?

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

$$V = \left[\frac{1}{3} \right] ([6] \times [6]) \times [12]$$

$$V = [12] \times 12$$

$$V = [144]$$

The volume of the pyramid is _____ m^3 .

7. The volume of a rectangular prism is 192 cm^3 . The prism has a base that is 16 cm by 3 cm. What is the height of the prism?

$$V = Bh$$

$$[192] = ([16] \times [3]) \times h$$

$$192 \div [48] = h$$

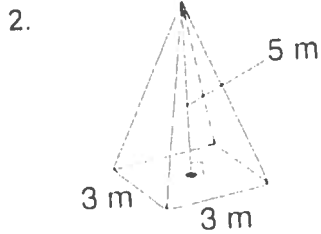
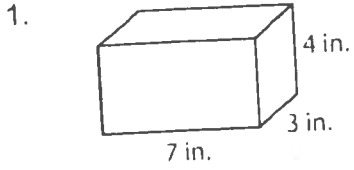
$$[4] = h$$

The height is _____ cm.

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0-1

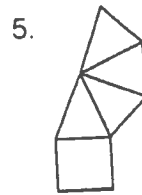
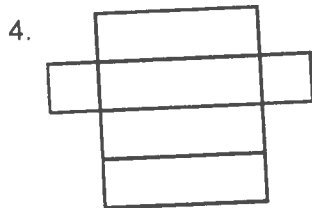
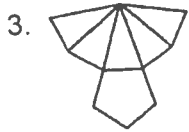
Volume of Rectangular Prisms and Pyramids
Practice and Problem Solving: A/B

Find the volume of each figure. Choose the letter for the best answer.



- | | | | |
|---------------------|---------------------|--------------------|--------------------|
| A 14 in^3 | C 28 in^3 | F 11 m^3 | H 15 m^3 |
| B 21 in^3 | D 84 in^3 | G 10 m^3 | J 45 m^3 |

Identify the three-dimensional shape that can be formed from each net.

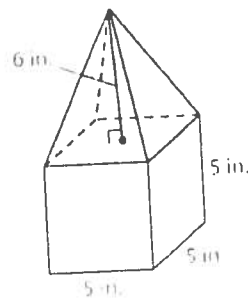


Solve.

6. The base of a rectangular pyramid is 13 inches long and 12 inches wide. The height of the pyramid is 8 inches. What is the volume of the pyramid?

7. A cake pan is shaped like a rectangular prism. The pan's volume is 216 in^3 . The cake pan has a base that is 12 inches by 9 inches. What is the height of the cake pan?

8. A form for a garden ornament is made up of two shapes, a cube and a square pyramid. To make an ornament the form is filled with concrete. What is the volume of the form?



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Volume of Rectangular Prisms + Pyramids

Q: How do you find the volume of a rectangular prism and a rectangular pyramid?

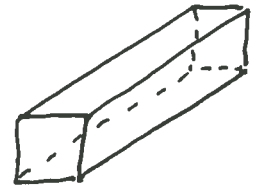
A: Substitute the dimensions into the formula for Volume.

Vocab

- 1.) Volume: the # of cubic units needed to fill a given space
- 2.) Pyramid: a 3D shape whose base is a polygon + whose other faces are triangles

Formula for volume of a rectangular prism

$$\text{Area of base } B = l \times w$$



$$\text{Volume of } = V = Bh$$

What is a prism? A polyhedron that has 2 congruent polygon-shaped bases and other faces that are all parallelograms.

What is a polyhedron? A 3D figure in which all surfaces or faces are polygons.

What is a polygon? A closed plane figure formed by 3 or more line segments that intersect only at their endpoints.

LESSON
10-1

Volume of Rectangular Prisms and Pyramids

Reading Strategies: Use a Visual Aid

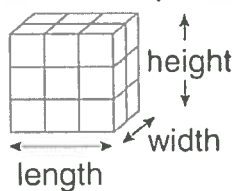
Think of the **volume** of a solid figure as the number of cubic units inside the figure.



one cubic unit

Use this rectangular prism to complete Exercises 1–4.

Each cube represents one cubic unit.



1. What is the length of this prism?

length = 3 units

2. What is the width of the prism?

width = 2 units

3. What is the height of the prism in the figure?

height = 3 units

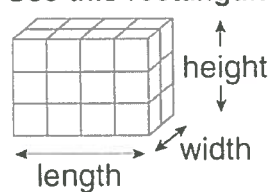
Multiply the length, width, and height of a prism to find its volume in cubic units.

$$\begin{array}{ccccccc}
 \text{Volume} & = & \text{length} & \cdot & \text{width} & \cdot & \text{height} \\
 \downarrow & & \downarrow & & \downarrow & & \downarrow \\
 V & = & l & \cdot & w & \cdot & h
 \end{array}$$

4. Multiply the length, width, and height of the prism above to find the volume. What is the volume?

volume = 18 cubic units

Use this rectangular prism to complete Exercises 5–7.



5. How long is the prism? How wide is the prism?

length = 4 units

width = 2 units

6. What is the height of the prism?

height = 3 units

7. Use the formula $V = l \cdot w \cdot h$ to find the volume of this prism.

volume = 24 cubic units

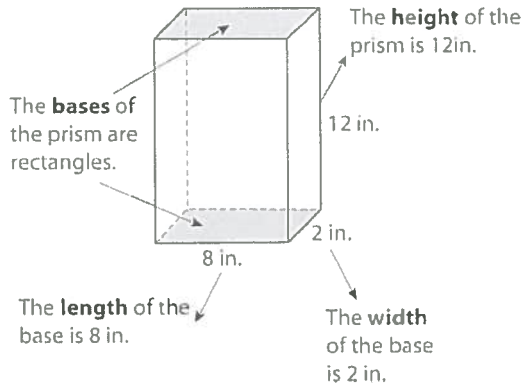
LESSON
10-1

Volume of Rectangular Prisms and Pyramids

Success for English Learners

Problem 1

Find the volume.

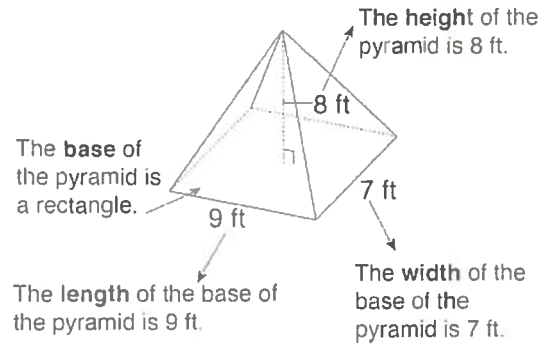


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The volume is 192 in^3 .

Problem 2

Find the volume.



$$\begin{aligned}
 B &= lw && l = 9, w = 7 \\
 &= 9 \cdot 7 \\
 &= 63 \text{ ft}^2 \\
 V &= \frac{1}{3} Bh && B = 63, h = 8 \\
 &= \frac{1}{3} \cdot 63 \cdot 8 \\
 &= 168 \text{ ft}^3
 \end{aligned}$$

The volume is 168 ft^3 .

1. Explain why the volume in Problem 1 is 192 in^3 instead of 192 inches.

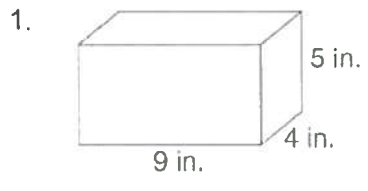
Volume is found by multiplying 3 dimensions
in x in x in

2. How do you find the volume of a pyramid if the base is a square?

$s^2 \times h \left(\frac{1}{3}\right)$

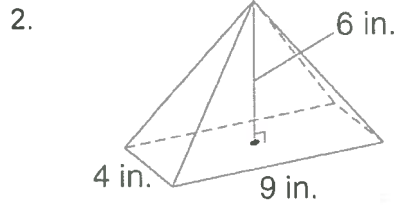
LESSON 10-1 **Volume of Rectangular Prisms and Pyramids**
Practice and Problem Solving: D

Find the volume of each figure. Choose the letter for the best answer. The first one is done for you.



- A 18 in^3
- B 54 in^3

C 180 in^3

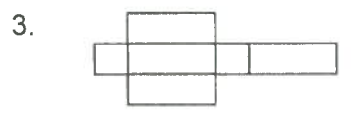


$$\frac{9 \times 4 \times 6^2}{3}$$

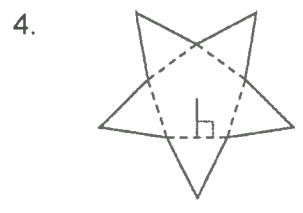
- F 19 in^3
- G** 72 in^3

H 216 in^3

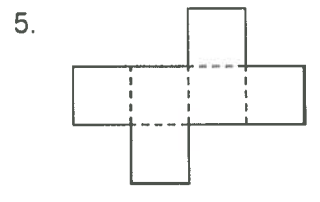
Identify the three-dimensional shape that can be formed from each net.



rectangular prism



pentagonal pyramid



Cube

Solve. The first one is done for you.

6. The base of a square pyramid is 6 meters on each side. The pyramid has a height of 12 meters. What is the volume of the pyramid?

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

$$V = \frac{[1]}{[3]} ([6] \times [6]) \times [12]$$

$$V = [12] \times 12$$

$$V = [144]$$

The volume of the pyramid is 144 m^3 .

7. The volume of a rectangular prism is 192 cm^3 . The prism has a base that is 16 cm by 3 cm. What is the height of the prism?

$$V = Bh$$

$$[192] = ([16] \times [3]) \times h$$

$$192 \div [48] = h$$

$$[4] = h$$

The height is 4 cm.