

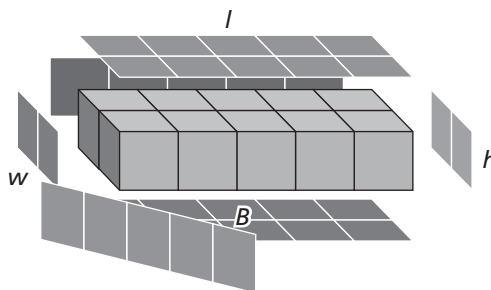


Content Overview

Dear Family,

In this unit, we are reviewing the volume of rectangular prisms with whole number edge lengths, and analyzing the difference between surface area and volume along with the units used to measure them.

The **surface area** of a solid figure is the total area of all its faces. **Volume** is the measure of the space that a three-dimensional figure occupies. The solid figure below is made of centimeter cubes.



l is the length.
 w is the width.
 h is the height.
 B is the area of the base.

Surface Area

$$SA = (2 \times 10) + (2 \times 2) + (2 \times 5) = 34$$

$$\text{Surface Area} = 34 \text{ cm}^2$$

Volume

$$V = lwh \text{ or } V = Bh$$

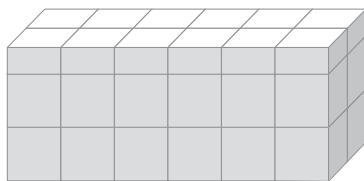
$$V = 5 \times 2 \times 1 \text{ or } V = 10 \times 1$$

$$\text{Volume} = 10 \text{ cm}^3$$

Surface area is measured in **square units**.

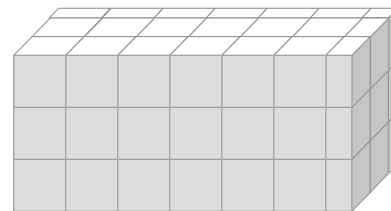
Volume is measured in **cubic units**.

This unit also introduces the volume of rectangular prisms with fractional edge lengths.



$$V = Bh = 12 \cdot 2\frac{1}{2} = 30,$$

$$\text{Volume} = 30 \text{ unit}^3$$



$$V = lwh = 6\frac{1}{2} \cdot 2\frac{1}{2} \cdot 3 = 48\frac{3}{4},$$

$$\text{Volume} = 48\frac{3}{4} \text{ unit}^3$$

If you need practice materials or if you have any questions, please call or write to me.

Sincerely,
Your child's teacher



CA CC

Unit 6 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions*: 6.G.1, 6.G.2, 6.G.4, 6.EE.2, 6.EE.2c, and all Mathematical Practices.

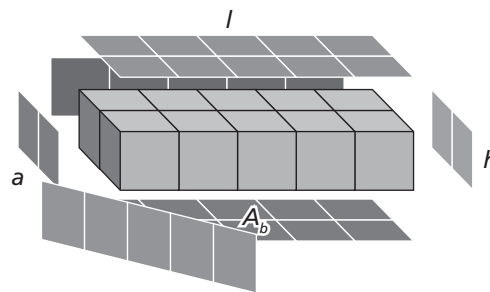


Un vistazo general al contenido

Estimada familia:

En esta unidad, repasaremos cómo obtener el volumen de prismas rectangulares cuyos lados tienen longitudes expresadas en números enteros. También analizaremos la diferencia entre el área total y el volumen y examinaremos las unidades de medida usadas.

El **área total** de un cuerpo geométrico es la suma del área de todas sus caras. El **volumen** es la medida del espacio que ocupa una figura tridimensional.



l es el largo
 a es el ancho
 h es la altura
 A_b es el área de la base

Área total

$$A_t = (2 \times 10) + (2 \times 2) + (2 \times 5) = 34$$

$$\text{Área total} = 34 \text{ cm}^2$$

Volumen

$$V = lah \text{ ó } V = A_b h$$

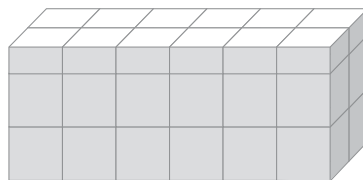
$$V = 5 \times 2 \times 1 \text{ ó } V = 10 \times 1$$

$$\text{Volumen} = 10 \text{ cm}^3$$

El área total se mide en **unidades cuadradas**.

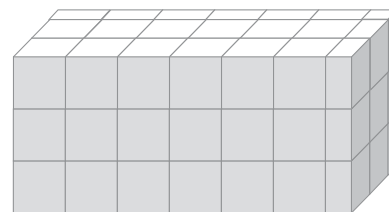
El volumen se mide en **unidades cúbicas**.

En esta unidad también se presenta el volumen de prismas rectangulares cuyos lados tienen longitudes expresadas en fracciones.



$$V = A_b h = 12 \cdot 2\frac{1}{2} = 30,$$

$$\text{Volumen} = 30 \text{ unidades}^3$$



$$V = lah = 6\frac{1}{2} \cdot 2\frac{1}{2} \cdot 3 = 48\frac{3}{4},$$

$$\text{Volumen} = 48\frac{3}{4} \text{ unidades}^3$$

Si necesita material para practicar o si tiene preguntas, por favor comuníquese conmigo.

*Atentamente,
 El maestro de su hijo*

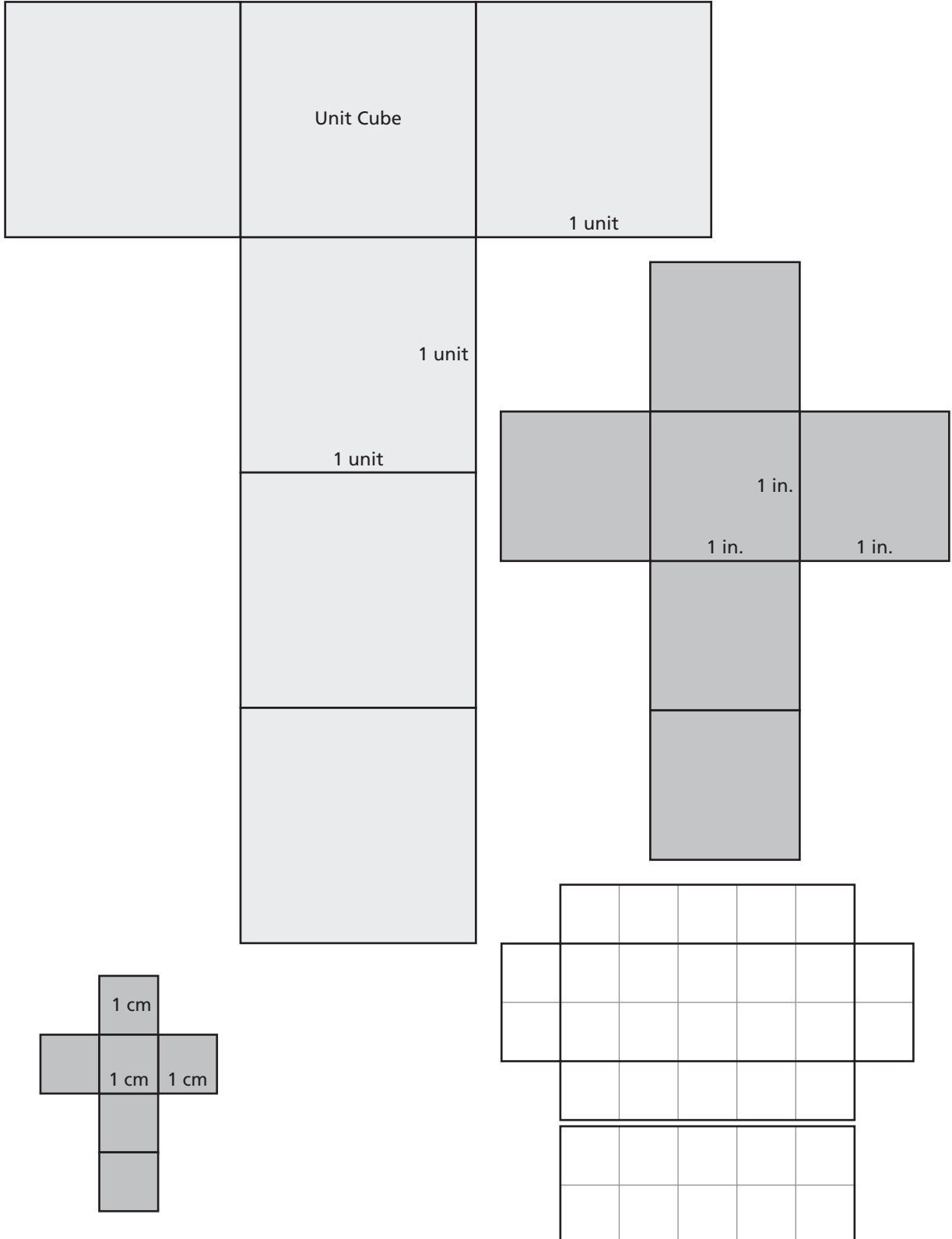


CA CC

En la Unidad 6 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California*: **6.G.1, 6.G.2, 6.G.4, 6.EE.2, 6.EE.2c**, y todos los de prácticas matemáticas.

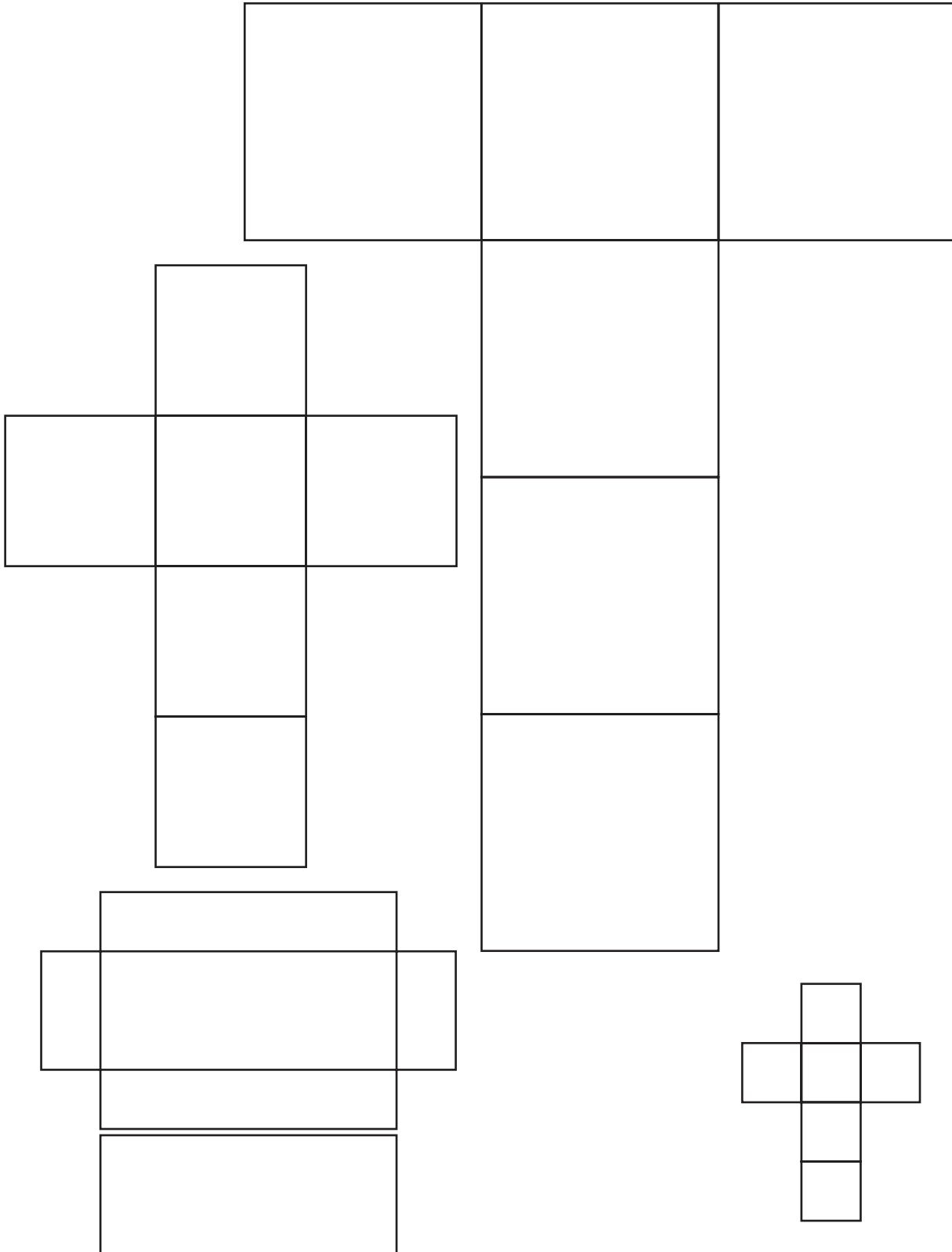
► Nets for Cubic Units and a Rectangular Prism

Cut out the nets and form the solid figure.





► Nets for Cubic Units and a Rectangular Prism (continued)



Vocabulary

- volume
- unit cube
- centimeter cube
- inch cube
- cubic unit (unit^3)
- cubic centimeter (cm^3)
- cubic inch (in.^3)

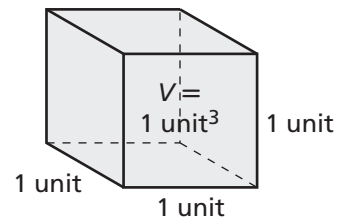
► Cubic Units

The **volume** of a solid figure is the amount of space occupied by the figure. Volume is measured in cubic units.

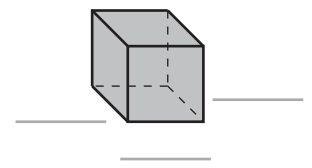


1. How can you measure the amount of space each of these rectangular prisms takes up? How much space is inside each of the rectangular prisms? How many unit cubes does it take to fill the rectangular prism?

A **unit cube** is a cube with each edge 1 unit long. The volume of a unit cube is 1 cubic unit. It can be written 1 cubic unit or 1 unit^3 .



2. Label the length, width, and height of the centimeter cube on the right. Write the volume of a centimeter cube in two ways.



Write the volume of the cube in two ways.

- | | | | |
|--------------|---------------|--------------|--------------|
| 3. inch cube | 4. meter cube | 5. foot cube | 6. yard cube |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |



► How Are Surface Area and Volume Different?

Complete.

7. What is the surface area of the unit cube you made?

8. What is the surface area of an inch cube?

9. How is volume different than surface area?

10. How is the unit used to measure surface area different from the unit used to measure volume?

11. What is the surface area and volume of the prism you made?

$SA =$ _____

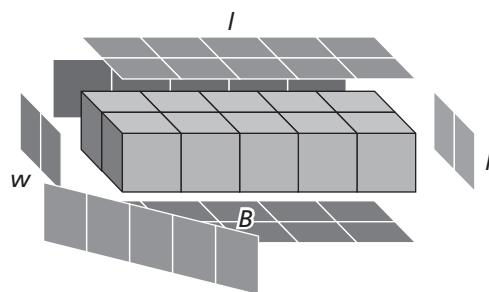
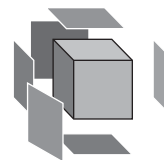
$V =$ _____

12. Write a formula for the surface area of the prism.

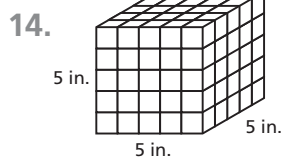
$SA =$ _____

13. Write two formulas for the volume of a rectangular prism.

$V =$ _____ $V =$ _____

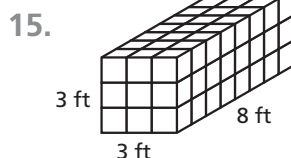


Find the surface area and volume of the prisms.



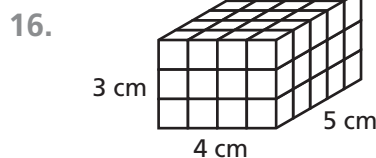
$SA =$ _____

$V =$ _____



$SA =$ _____

$V =$ _____



$SA =$ _____

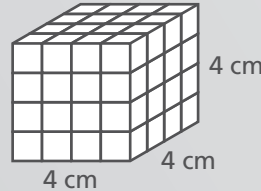
$V =$ _____

► What's the Error?

Dear Math Students,

My assignment was to make a prism with a volume of 4 cm^3 . I made the prism at the right. My friend says I have too many cubes in the prism. Who is right? Explain.

Your friend,
Puzzled Penguin

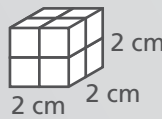


17. Write a response to the Puzzled Penguin.

Dear Math Students,

I found the volume of a cube that is 2 cm by 2 cm by 2 cm to be 6 cm^3 , but when I built the cube out of centimeter cubes it took 8 cubes and not 6. What did I do wrong?

Your friend,
Puzzled Penguin



18. Write a response to the Puzzled Penguin.



► Choose a Measure

Choose the most appropriate measure. Write *perimeter*, *surface area*, or *volume*.

19. the distance around a building _____
20. the amount of wrapping paper on a gift box _____
21. the amount of sand in a sand box _____
22. the amount of wall space in a room _____
23. the length of a fence around a yard _____
24. the amount of peanuts in a container _____

► Solve Real World Problems

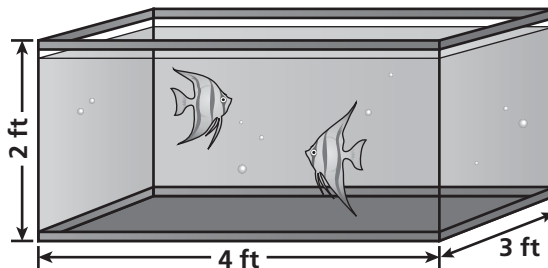
Solve.

25. How many cubic feet of water will it take to fill this aquarium? What is the open surface area of the water?

26. Hal wants to make a hole in the wall of his restaurant to display one of the larger faces of this aquarium. He cut a hole that is 25 in. high by 27 in. long. Will the aquarium fit? Explain.

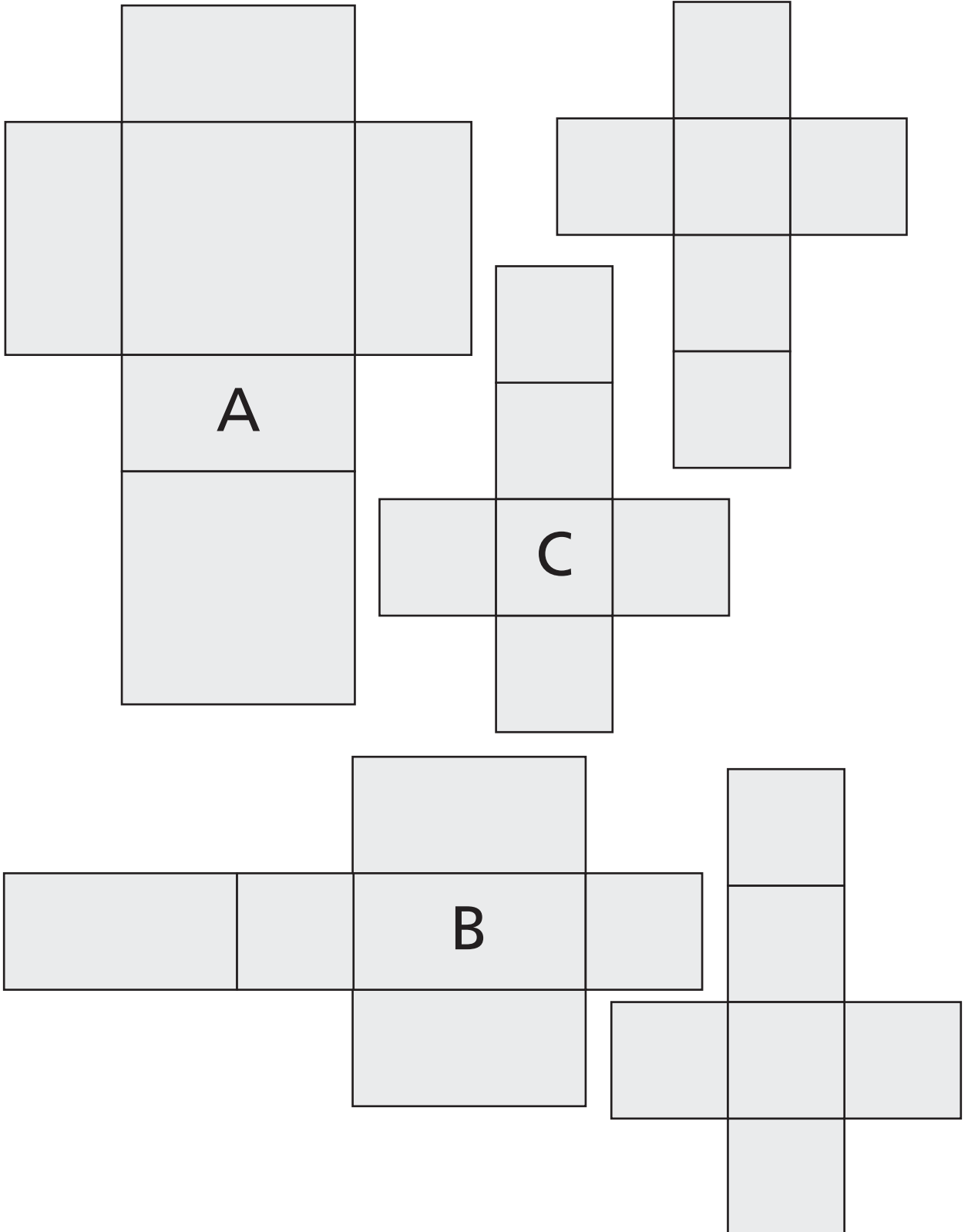
27. The sides of this aquarium are glass. How much glass did it take to make the aquarium?

28. What is the greatest number of rectangular 2 in. \times 2 in. \times 4 in. boxes that will fit in a carton with a volume of 3,456 in.³ and a 12 in. \times 24 in. rectangular base?

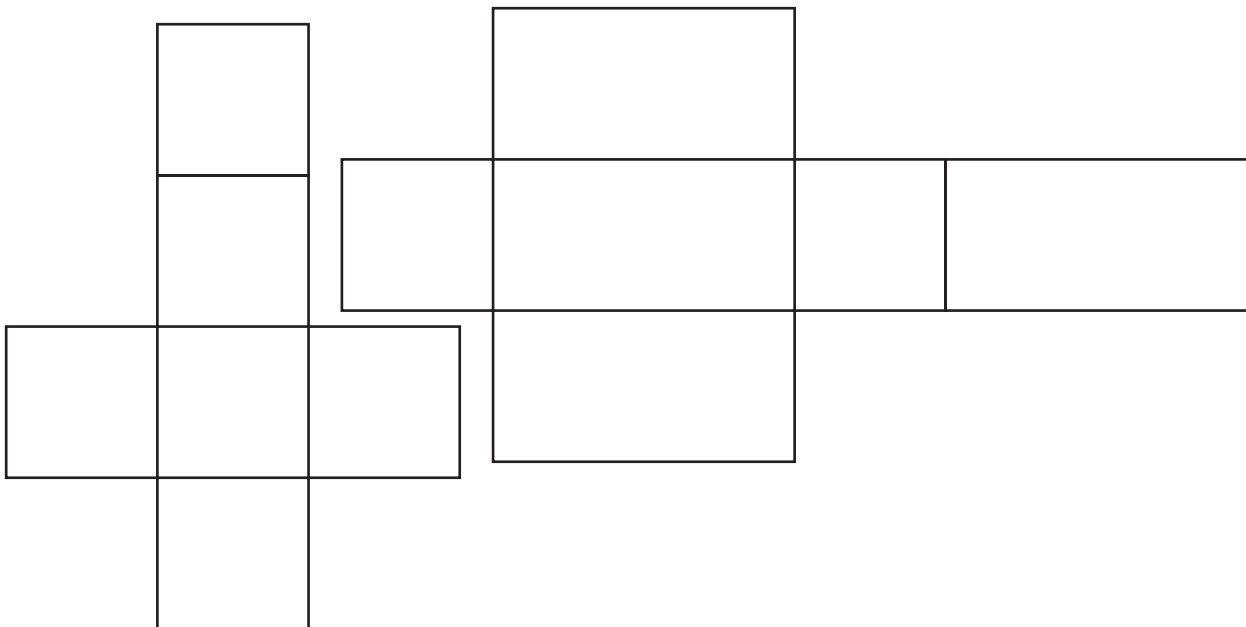
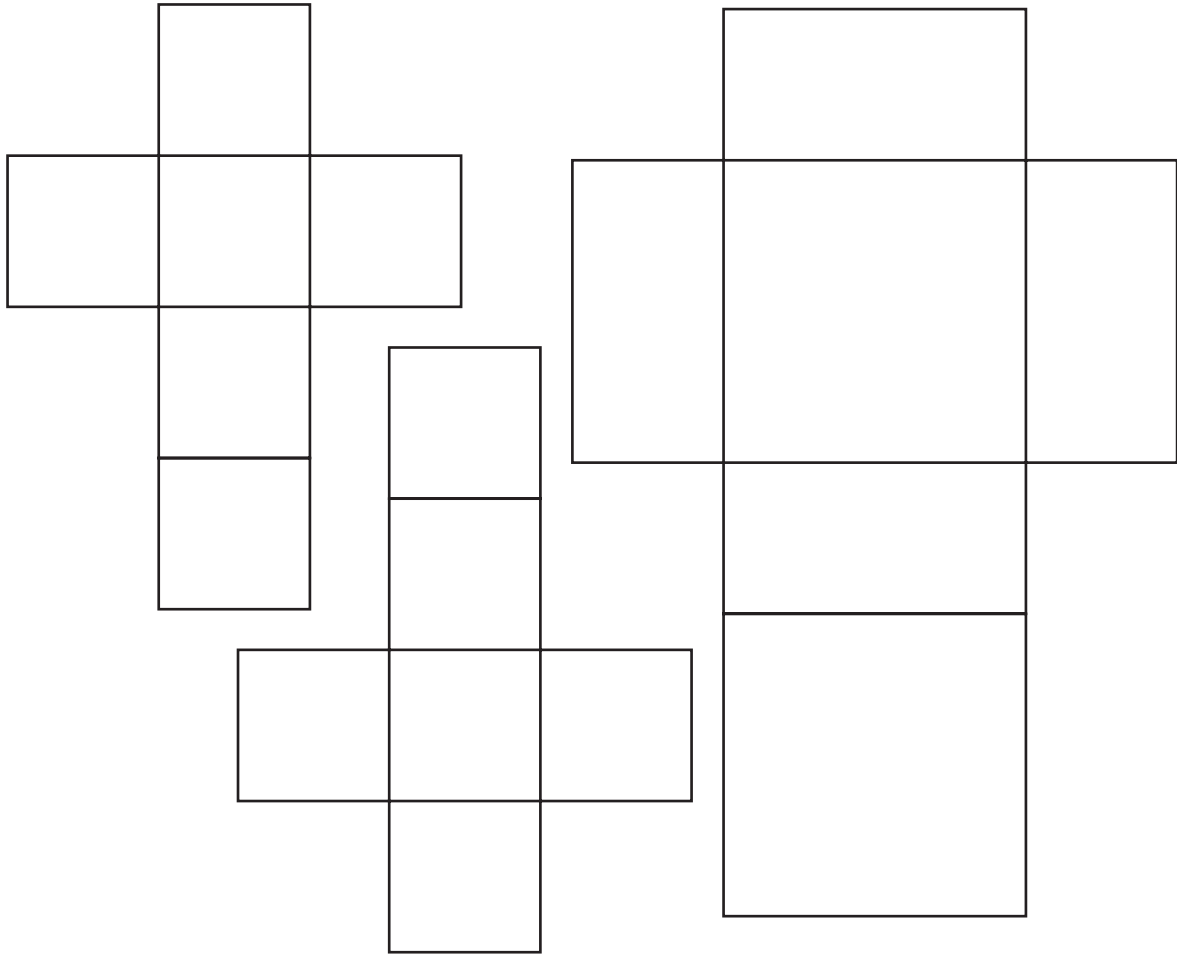


► Nets for Part of a Unit Cube

Cut out the nets and form the solid figures.

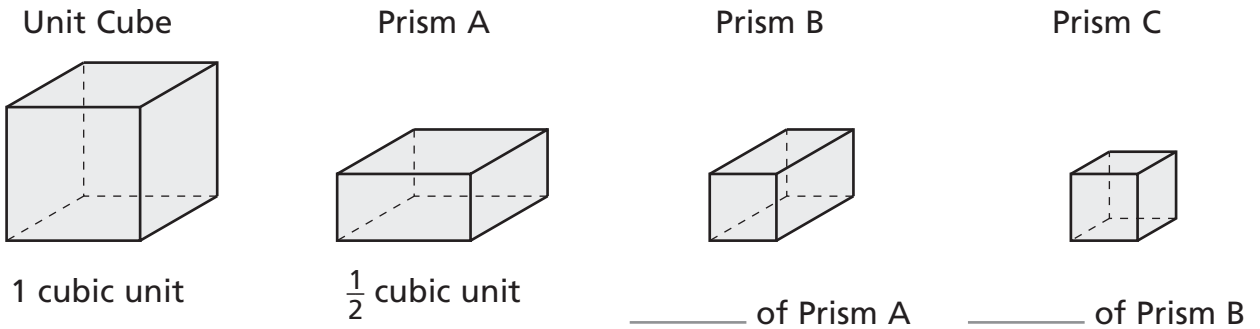


► Nets for Part of a Unit Cube (continued)



► Rectangular Prisms with Volumes Less Than 1 Cubic Unit

Place the cubes on your desk in order from greatest volume to least volume as shown below.



1. How many of each of these prisms does it take to make the Unit Cube?

Prism A: _____ Prism B: _____ Prism C: _____

2. What is the volume of each prism?

Prism A	Prism B	Prism C
V = _____	V = _____	V = _____

Some students found the volume of prism B by multiplying.

	Volume of Prism B	Volume of Prism C
Terence	$\frac{1}{2}$ of $\frac{1}{2}$ of a unit cube or $\frac{1}{4}$ unit ³ .	
Serena	$\frac{1}{2} \cdot \frac{1}{2}$ of a cubic unit or $\frac{1}{4}$ unit ³ .	
Emma	It takes $\frac{1}{4}$ of a unit cube or $\frac{1}{4}$ unit ³ to make prism B.	

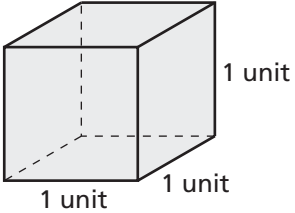
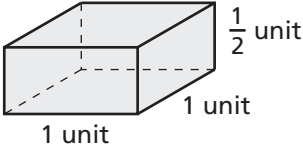
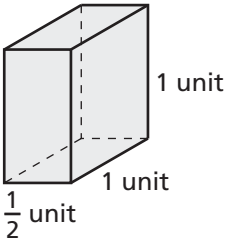
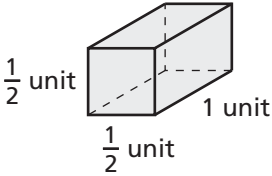
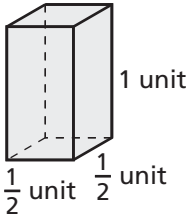
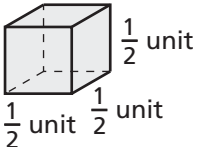
3. Why are all 3 descriptions correct?

4. Complete the chart to show how Terrence, Serena, and Emma would describe the volume of Prism C.



► Calculate Volume Less Than 1 Cubic Unit

Complete the table.

	Prism	length (l)	width (w)	height (h)	length \times width \times height (lwh)	$lwh = V$
5.		1 unit	1 unit	1 unit	$1 \cdot 1 \cdot 1$	$1 \cdot 1 \cdot 1 =$ 1 or 1 unit^3
6.						
7.						
8.						
9.						
10.						

11. How is the volume of a prism related to the length, width, and height of the prism? _____

► Find Volume by Packing with Unit Cubes

Solve.

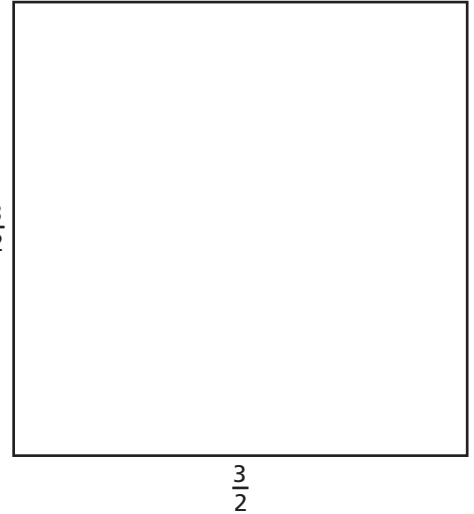
12. Model a prism with the base to the right and a height of $\frac{1}{2}$ unit. Use your cubes with $\frac{1}{2}$ unit edge lengths as a unit cube.
13. How many cubes with $\frac{1}{2}$ unit edge lengths did it take to make the prism? _____
14. What equation can you write to show the volume of 9 of these cubes?

15. What other equation can you write to describe the volume of the $\frac{3}{2}$ unit by $\frac{3}{2}$ unit by $\frac{1}{2}$ unit prism?

16. Suppose you built a prism on a square base of $\frac{4}{3}$ unit by $\frac{4}{3}$ unit with a height of $\frac{1}{3}$ unit. If you use a cube with $\frac{1}{3}$ unit edge lengths as a unit cube, how many cubes would it take to form the prism?

17. What two equations could you write to show the volume of the $\frac{4}{3}$ unit by $\frac{4}{3}$ unit by $\frac{1}{3}$ unit prism?

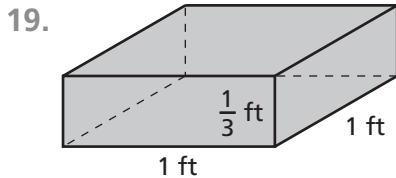
18. What equation could you write to show the volume of a $\frac{1}{n}$ by $\frac{1}{n}$ by $\frac{1}{n}$ cube?



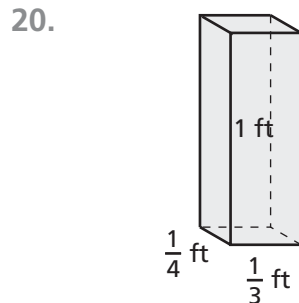


► Volumes of Prisms with Fractional Edge Lengths

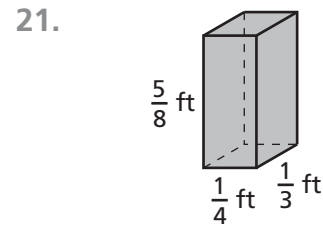
Find the volume.



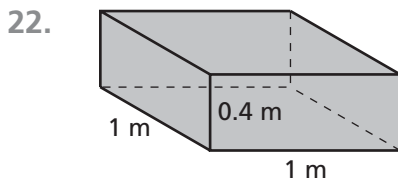
$V =$ _____



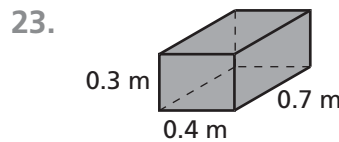
$V =$ _____



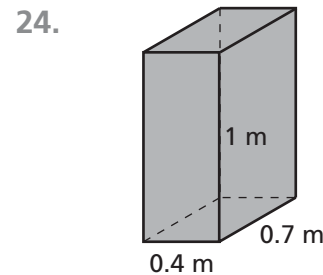
$V =$ _____



$V =$ _____



$V =$ _____



$V =$ _____

25. Describe two different rectangular prisms that each have a volume of $\frac{6}{175}$ in.³

a. What three factors will result in a product of 6?

b. What three factors will result in a product of 175?

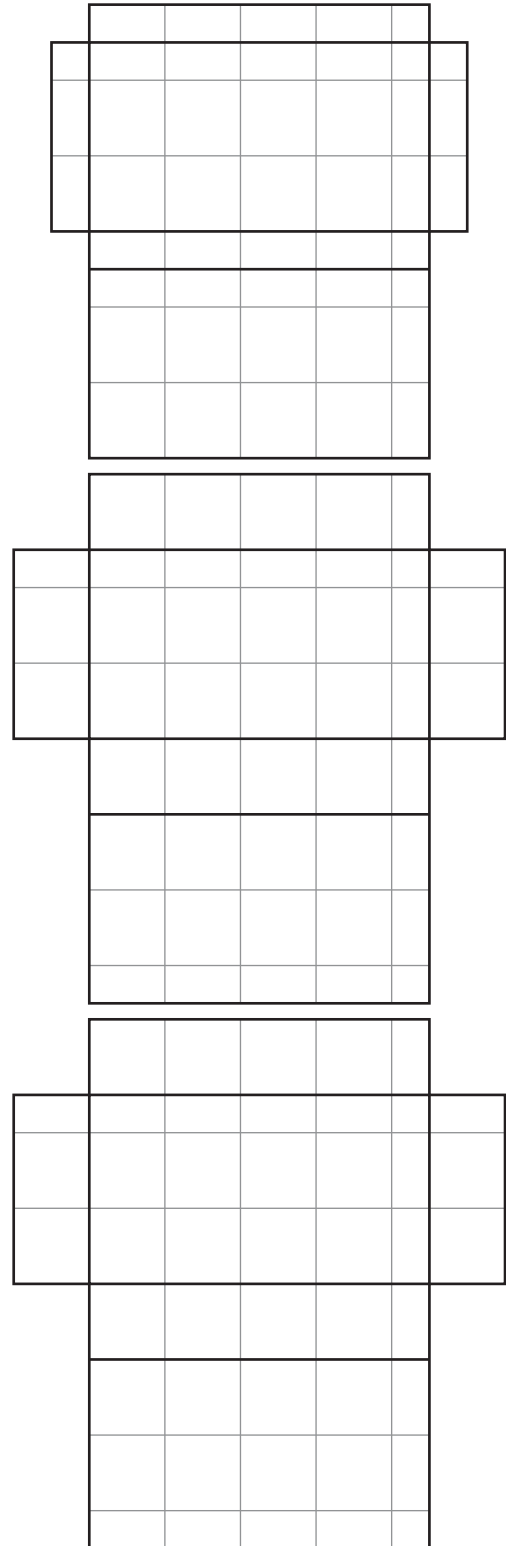
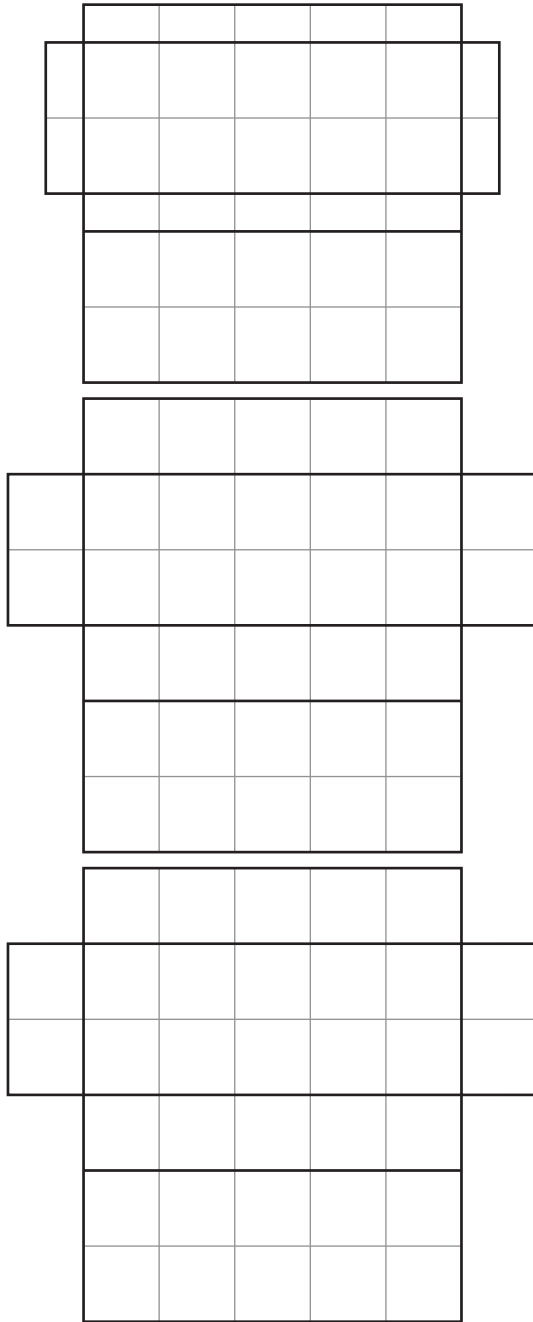
c. What fractions can you make with these factors that could be the dimensions of one rectangular prism?

d. What different fractions can you make with these factors that could be the dimensions of a different rectangular prism?

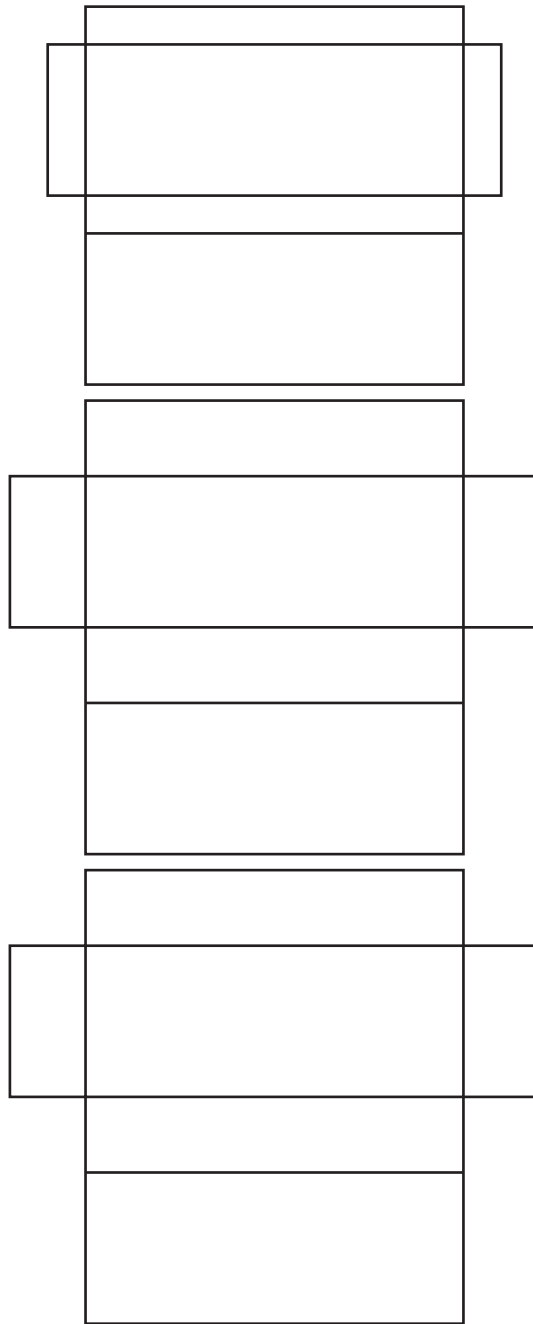
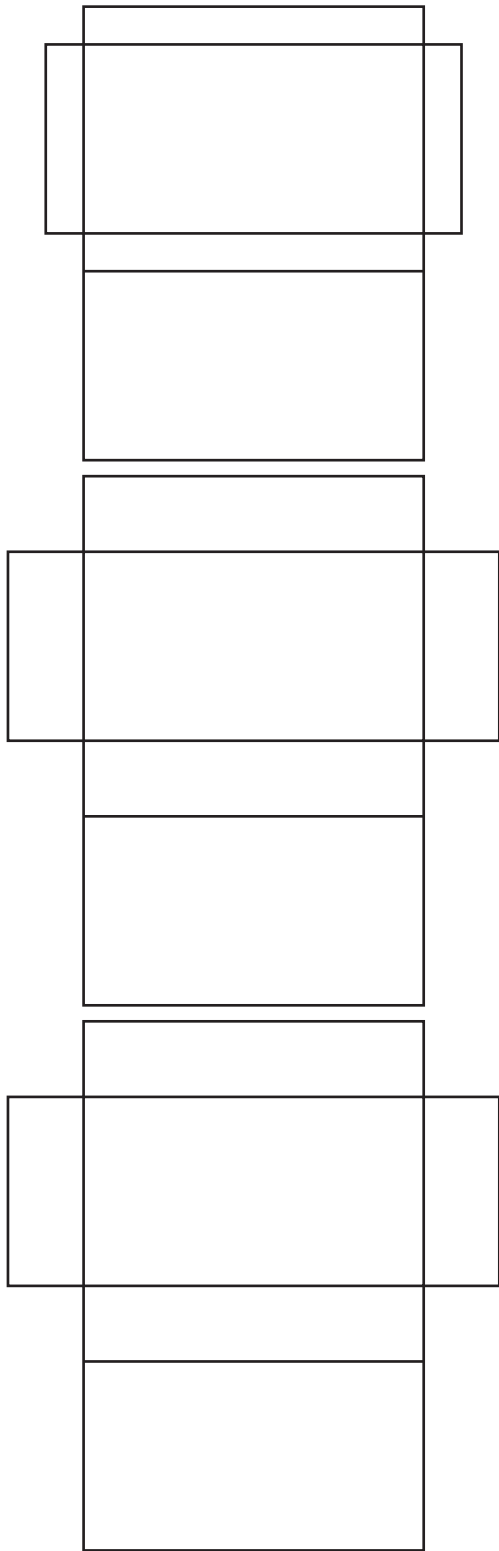
26. Describe two different rectangular prisms that each have a volume of 0.125 m³.

► Prism Layers

Cut out the nets and form the solid figures.

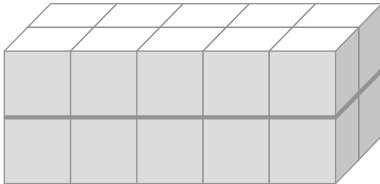


► Prism Layers (continued)



► Build a Prism with Whole and Half Layers

Here is how to build a prism that has a length of 5 cm, a width of 2 cm, and a height of $2\frac{1}{2}$ cm using whole and half layers.



- Stack two layers of a prism that has a 5 cm by 2 cm base and is 1 cm tall.
- Next stack one layer of a prism that has a 5 cm by 2 cm base and is $\frac{1}{2}$ cm tall.

Build prisms with whole and half layers to complete the table below.

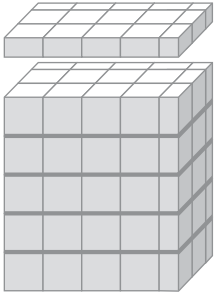
	length (l) (in cm)	width (w) (in cm)	length \times width (lw)	Area of Base (B)	height (h)	$V = Bh$
1.	5	2	$5 \cdot 2$	10 10 cm ²	$\frac{1}{2}$ cm	
2.	5	2			1 cm	
3.	5	2			$1\frac{1}{2}$ cm	
4.	5	2			2 cm	
5.	5	2			$3\frac{1}{2}$ cm	
6.	5	2			4 cm	
7.	5	2			$4\frac{1}{2}$ cm	
8.	5	2			5 cm	
9.	5	2			$5\frac{1}{2}$ cm	

10. Explain the expression you wrote for the volume of the prism with the $3\frac{1}{2}$ cm height in terms of layers of cubes.



► Build a Prism with Fractional Base Dimensions

Here is how to build a prism that has a length of $4\frac{1}{2}$ cm and a width of $2\frac{1}{2}$ cm and a height of $5\frac{1}{2}$ cm using whole and half layers.



- Stack five layers of a prism that has a $4\frac{1}{2}$ cm by $2\frac{1}{2}$ cm base and is 1 cm tall.
- Next stack one layer of a prism that has a $4\frac{1}{2}$ cm by $2\frac{1}{2}$ cm base and is $\frac{1}{2}$ cm tall.

Use this table to record the volumes of the prisms you build.

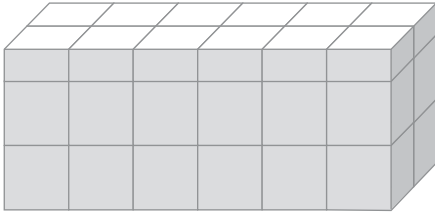
	length (l) (in cm)	width (w) (in cm)	Area of Base (B)	height (h)	$V = Bh$
11.	$4\frac{1}{2}$	$2\frac{1}{2}$	$11\frac{1}{4}$ $11\frac{1}{4} \text{ cm}^2$	1 cm	$V = 11\frac{1}{4} \cdot 1 = 11\frac{1}{4}$ $V = 11\frac{1}{4} \text{ cm}^3$
12.	$4\frac{1}{2}$	$2\frac{1}{2}$		$\frac{1}{2}$ cm	
13.	$4\frac{1}{2}$	$2\frac{1}{2}$		$1\frac{1}{2}$ cm	
14.	$4\frac{1}{2}$	$2\frac{1}{2}$		$2\frac{1}{2}$ cm	
15.	$4\frac{1}{2}$	$2\frac{1}{2}$		$3\frac{1}{2}$ cm	
16.	$4\frac{1}{2}$	$2\frac{1}{2}$		4 cm	
17.	$4\frac{1}{2}$	$2\frac{1}{2}$		$4\frac{1}{2}$ cm	

18. Explain the expression you wrote for the volume of the prism with a $2\frac{1}{2}$ cm height in terms of layers of cubes.

► Use Formulas

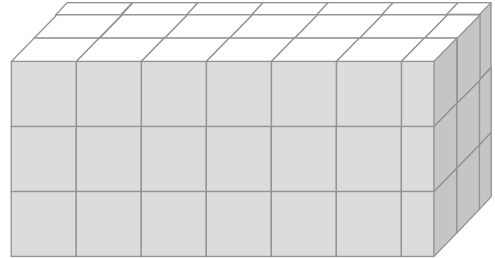
Find the volume. Each cube represents 1 cm^3 .

19.



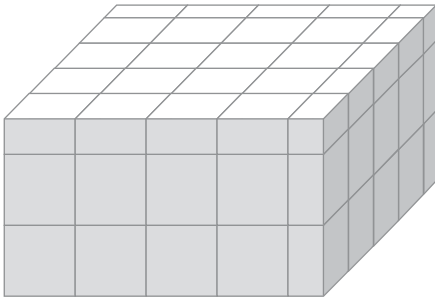
$V =$ _____

20.



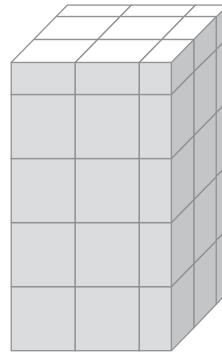
$V =$ _____

21.



$V =$ _____

22.



$V =$ _____

23. Explain why we can use the two formulas below for the volume of a prism. V stands for the volume of the rectangular prism. l and w stand for the length and width of the base, h stands for the height, and B stands for the area of the base.

$V = lwh$

$V = Bh$

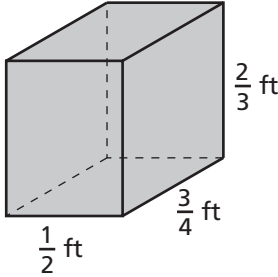
**► Find the Unknown Dimension or Volume***Show your work***Write and solve an equation.**

24. A ring box in the shape of a rectangular prism has a volume of 25 cm^3 and is $2\frac{1}{2} \text{ cm}$ tall. What is the area of the base (B) of the ring box?
-
25. A jewelry box in the shape of a rectangular prism has a volume of 90 in.^3 and a height of $2\frac{1}{2} \text{ in.}$ What are possible whole dimensions for the length and width of the base?
-
26. A storage tank in the shape of a rectangular prism has a volume of 35 m^3 and a height of 2.5 m . The length of the base of the prism is 3.5 m . What is the width of the base of the storage tank?
-
27. A shipping box in the shape of a rectangular prism has a volume of $1\frac{1}{2} \text{ ft}^3$. The area of the base is $\frac{2}{3} \text{ ft}^2$. What is the height of the shipping box?
-
28. A small trunk in the shape of a rectangular prism has a volume of 0.15 m^3 . The area of the base is 0.25 m^2 . What is the height of the small trunk?
-
29. A stack of sticky notes in the shape of a rectangular prism has a base with an area of $1\frac{1}{8} \text{ in.}^2$ and a height that is $1\frac{1}{3} \text{ in.}$ What is the volume of the stack of sticky notes?
-
30. An eraser in the shape of a rectangular prism has a length of 3.5 cm , a width of 2.8 cm and a height 1.4 cm . What is the volume of the eraser?
-

► Volumes of Prisms with Fractional Edge Lengths

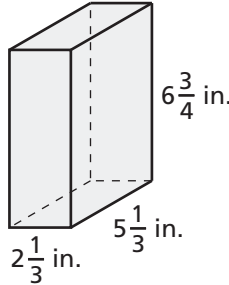
Write a numerical expression for the volume. Then calculate the volume.

1.



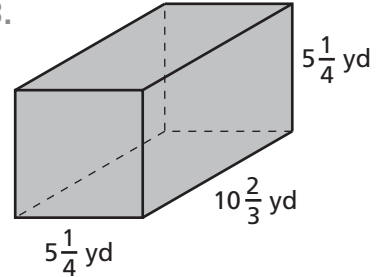
$V =$ _____

2.



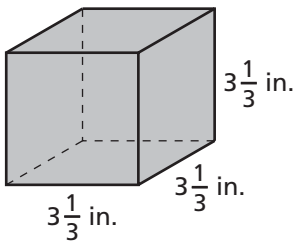
$V =$ _____

3.



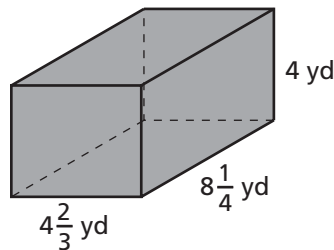
$V =$ _____

4.



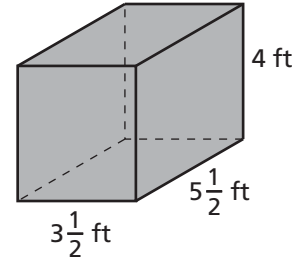
$V =$ _____

5.



$V =$ _____

6.



$V =$ _____

Find the unknown dimension or volume of each rectangular prism.

7. $l = 4.5$ cm

$w = 2.7$ cm

$h = 3.2$ cm

$V =$ _____

8. $V = 156$ ft³

$l = 4\frac{4}{5}$ ft

$w = 6\frac{1}{2}$ ft

$h =$ _____

9. $V = 209.3$ m³

$l = 7$ m

$h = 4.6$ m

$w =$ _____

10. $V = 279$ in.³

$w = 6\frac{1}{5}$ in.

$h = 7\frac{1}{2}$ in.

$l =$ _____



► Solve Real World Problems

Show your work

Solve.

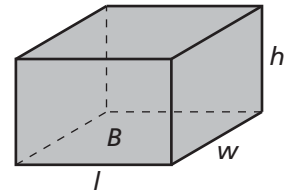
11. A 20 ft by 20 ft square garden is being covered with 3 in. of mulch. How many cubic feet of mulch will be needed?
-
12. A rectangular cargo container is 2.5 m wide, 3.1 m tall, and 10 m long. What is the volume of the container in cubic meters?
-
13. Sue's collection of baseball cards forms a stack that is 3 in. high. If the cards are $2\frac{1}{4}$ in. wide and $5\frac{1}{2}$ in. long. What is the volume of the stack of cards?
-
14. Sue bought a box to hold her baseball cards. The box is $2\frac{1}{2}$ in. wide and $5\frac{1}{2}$ in. long and has a volume of 55 in.^3 . How tall a stack of cards can fit in the box?
-
15. A rectangular shipping box has a bottom that is 1 ft by 2 ft. The height of the box is 9 in. What is the volume of the box in cubic feet?
-
16. A tree ornament comes in a box that is $5\frac{1}{2}$ in. tall with a square top and bottom. The box has a volume of $49\frac{1}{2} \text{ in.}^3$. How long is each side of the base?
-
17. A foam mattress measures $3\frac{1}{3}$ ft by $6\frac{2}{3}$ ft by 6 in. How many cubic feet of foam form the mattress?
-

► Units for l , w , h , B , and V

If V is the volume of the prism, then we can write these formulas.

$$V = lwh \qquad V = Bh$$

These equations show how the volume of the prism is related to other dimensions of the prism.



Complete.

1. If the value for h is given in centimeters, what unit should we use for l and w ? _____
2. If the values for l , w , and h are given in centimeters, what unit should we use for B ? _____
3. If the values for l , w , and h are given in centimeters, what unit should we use for V ? _____

► What's the Error?

Dear Math Students,

Here is how I found the number of cubic feet of mulch needed on the garden pictured at the right.

$$V = lwh$$

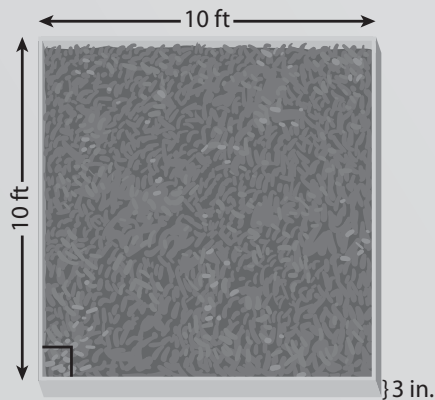
$$V = 10 \cdot 10 \cdot 3 = 300$$

The volume is 300 ft³.

My friend says this is not the correct answer. What did I do wrong?

Your friend,

Puzzled Penguin



4. Write a response to the Puzzled Penguin.



► What's the Error?

Dear Math Students,

I see in the formula $V = lwh$ that I need to multiply three edge lengths to find the volume. The prism has a lot more edges. Why don't we multiply all the edge lengths to find the volume?

Your friend,
Puzzled Penguin



5. Write a response to the Puzzled Penguin.

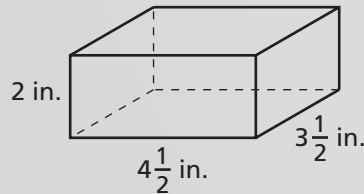
Dear Math Students,

Here is how I found the volume of the prism at the right. Is my answer correct?

$$V = 4\frac{1}{2} \times 2 = 9$$

The volume is 9 in.^3

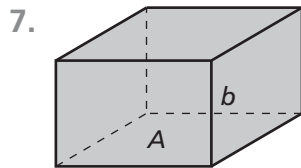
Your friend,
Puzzled Penguin



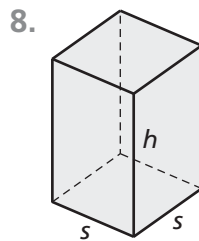
6. Write a response to the Puzzled Penguin.

► Write Equations for Volume

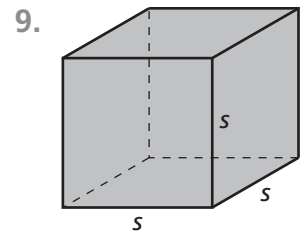
Write an equation for volume, V , using the variables given.



$V =$ _____



$V =$ _____



$V =$ _____

10. A rectangular prism that is c units by d units by e units has a volume, V , cubic units. Write an equation relating c , d , e , and V . _____

11. A rectangular prism has a base area of M square units and is t units tall. Write an equation relating M , t , and V .

12. A rectangular prism is 5 units tall and has a base area of W square units. Write an equation relating W and V .

► Surface Area and Volume of a Cube

Solve.

Each edge of a cube is $\frac{1}{2}$ in. long.

13. What is the surface area of the cube?

14. What is the volume of the cube?

A cube has a volume of 8 m^3 .

15. What is the length of each edge?

16. What is the surface area of the cube?

One face of a cube has an area of 2.25 cm^2 .

17. What is the length of each edge?

18. What is the volume of the cube?



► Solve Real World Problems

Solve.

Show your work

19. An aquarium is 18 in. by 16 in. by 12 in. Water fills $\frac{3}{4}$ of the aquarium. What is the volume of the water?

20. A sandbox is 5 ft by 6 ft by 1 ft. Sand fills half the sandbox. What is the volume of the sand?

21. Which holds more: two cube containers with $12\frac{1}{2}$ ft edges or one rectangular prism container with height $12\frac{1}{2}$ ft, width 11 ft, and length 25 ft? How much more?

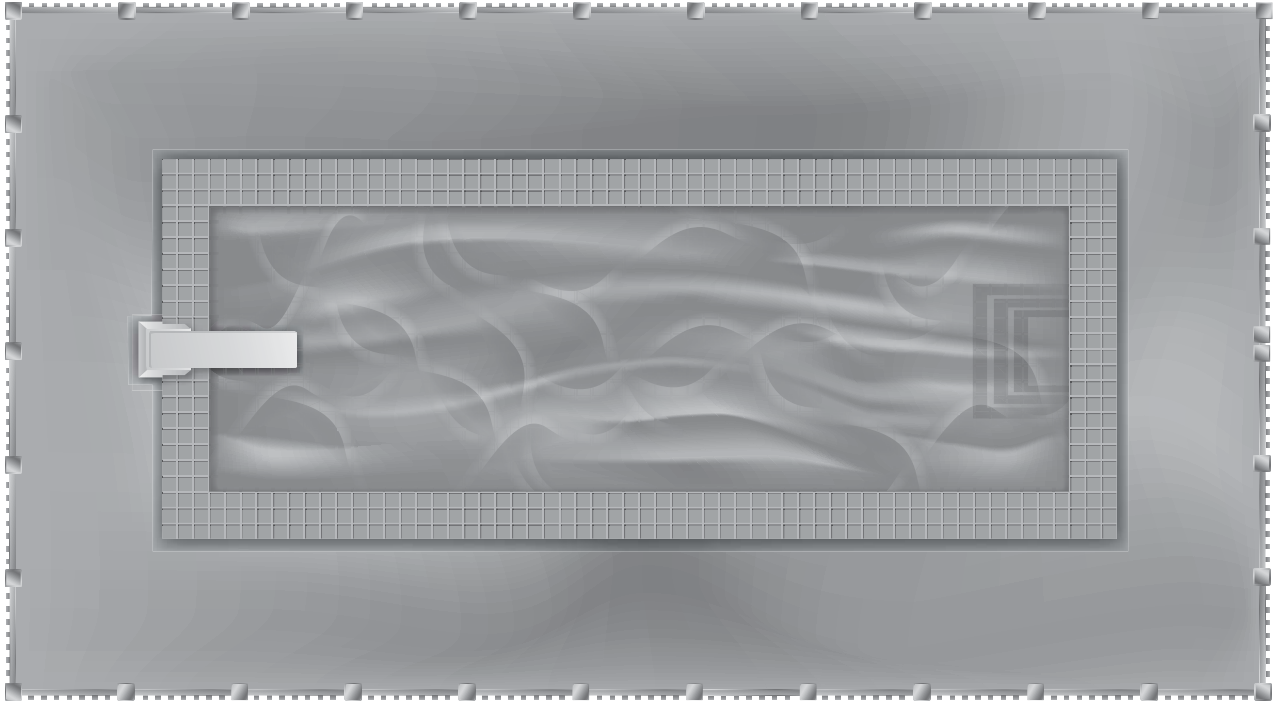
22. Which has the greatest surface area: A cube gift box with $\frac{1}{2}$ ft edges or a rectangular prism gift box with a height of $\frac{1}{2}$ ft, width $\frac{1}{4}$ ft, and length 1 ft? How much more?

23. The length of a shipping box is twice its width. The width of the box is $7\frac{1}{2}$ in. The height is $2\frac{1}{2}$ in. less than the length. What is the volume of the box?

24. If a mailbox at a post office rents for one year for \$0.15 per in.³, how much will it cost to rent a mailbox that is $4\frac{1}{2}$ in. by 12 in. by $5\frac{1}{2}$ in.?

25. A box of staples has length $4\frac{1}{2}$ in., width $2\frac{1}{4}$ in. and height $\frac{3}{4}$ in. What is the greatest number of boxes of staples that can be shipped in a box measuring 9 in. by 18 in. with a height of 12 in.?

► Math and Construction



The Best Pool Construction Company is building a community swimming pool. The company has hired you and your associate to find how much tile and fencing needs to be ordered to finish the pool.

The pool is a rectangle 60 ft long and 20 ft wide. One third of the pool is 4 ft deep and the remaining part has a depth of 7 ft. There is to be a 3-ft wide tile deck around the entire pool and a safety fence around the entire area 11 ft from the edge of the tile deck.

1. What strategy will you use to find how much fence and tile is needed to finish the pool?



► Make a Drawing

Complete.

2. Use the information in the problem on Student Book page 277 to make a drawing at the right of a top view of the pool, tile, and fence. Label all the dimensions.
3. How many square feet of tile should be ordered for tile deck?

4. Safety fence is sold in 8-ft sections. How many sections should be ordered?

5. How many cubic feet of water will it take to fill the pool up to 6 in. below the top?





1. Select True or False for each statement.

- 1a. Surface area and volume both measure the amount of space occupied by a solid figure. True False
- 1b. Surface area and volume are measured using the same unit. True False
- 1c. Surface area and volume are both attributes of solid figures. True False

2. Fill in the bubble next to the unit used to measure volume.

- square units cubic units linear units

Explain your answer choice in words or with a labeled sketch.

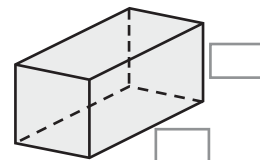
3. The volume of a rectangular pyramid can be found using the formula $V = Bh$.

Part A: Use the tiles to show a different formula you can use to find the volume of a rectangular prism. You will not need to use every tile.



Part B: Explain how the two formulas are related, and why you can use either formula to find the volume of a rectangular prism.

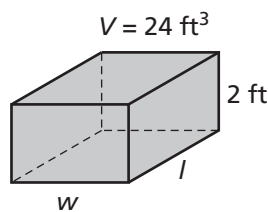
4. The equation for the volume of the square prism is $V = Mt$. Label the prism.





5. Choose one value from each column to make the volume of the rectangular prism true.

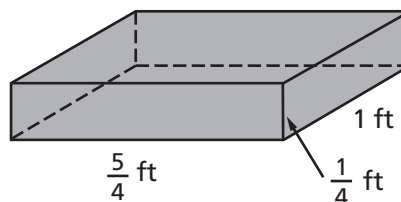
<i>w</i>	<i>l</i>
<input type="radio"/> 3	<input type="radio"/> 1
<input type="radio"/> 5	<input type="radio"/> 2
<input type="radio"/> 9	<input type="radio"/> 3
<input type="radio"/> 10	<input type="radio"/> 4



6. Use mental math to find the volume.



7. The volume of a prism can be found by packing it with unit cubes of the appropriate edge lengths.



Part A

What is the longest edge length that would be appropriate for the unit cubes? Explain your answer.

_____ edge lengths

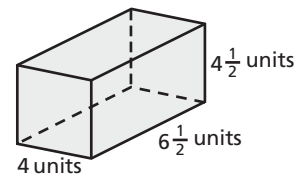
Part B

If the longest dimension of the prism was $1\frac{1}{8}$ feet, would the length you chose in Part A be sensible? Explain.

8. Cecilia used layers to find the volume of the prism below.

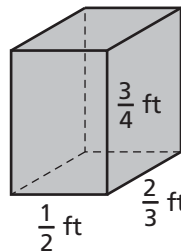
Part A Explain how to find the volume using layers.

Part B Use layers to find the volume of the prism.



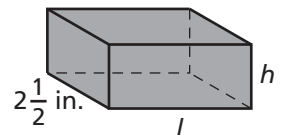
$V = \underline{\hspace{2cm}}$ cubic units

9. Find the volume. Show your work.



$V = \underline{\hspace{2cm}}$

10. The dimensions on the tiles below are values for l and h . For a prism with $w = 2\frac{1}{2}$ in., identify those expressions that will produce a volume of 270 in.^3 and those that will produce a volume of 300 in.^3



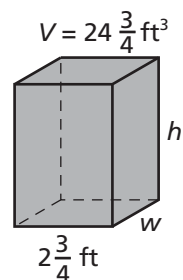
- 9 in. • 12 in.
- $2\frac{1}{2}$ in. • 48 in.
- 24 in. • $4\frac{1}{2}$ in.
- 6 in. • 18 in.
- 16 in. • $7\frac{1}{2}$ in.
- 15 in. • 8 in.
- 20 in. • $5\frac{2}{5}$ in.

Volume: 270 in.^3	Volume: 300 in.^3



11. Choose one value from each column to make the volume of the rectangular prism true.

w	h
<input type="radio"/> $1\frac{1}{4}$	<input type="radio"/> 3
<input type="radio"/> $1\frac{3}{4}$	<input type="radio"/> 4
<input type="radio"/> 2	<input type="radio"/> 5
<input type="radio"/> $2\frac{1}{4}$	<input type="radio"/> 6



- Select Yes or No to indicate if the equation represents the volume for the prism with sides e .

12a. $V = e \bullet e \bullet e$

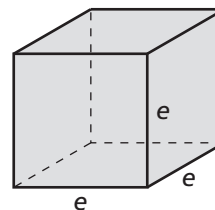
Yes No

12b. $V = 3e$

Yes No

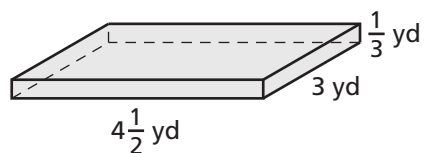
12c. $V = e^3$

Yes No



13. Substitute the dimensions shown below into the volume formula to find the volume of the prism.

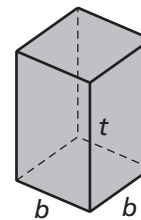
Show your work.



$V =$ _____



14. Anthony labeled this rectangular prism.



Part A

Select the equations that represent the volume of the prism. Mark all that apply.

(A) $V = b + b + t$

(C) $V = b^2t$

(B) $V = b \cdot b \cdot t$

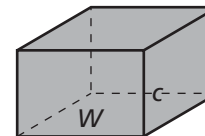
(D) $V = b^2 + t$

Part B

Show your work. Find the volume of the prism if $b = 3$ cm and $t = 7.5$ cm.

$V =$ _____

15. Write an equation for the volume of the prism using the given variables.



$V =$ _____

16. A gift box has a volume of 199 in.^3 . The area of the base of the box is $49\frac{3}{4} \text{ in.}^2$. What is the height?

$h =$ _____

17. A small pool in the shape of a rectangular prism has a length of $6\frac{1}{2}$ ft, a width of 5 ft and a height of 24 in. Jeb says the volume of the pool is 780 ft^3 .

Is Jeb correct? If he is, show how he may have found the volume. If not, explain what he did wrong and give the correct volume.

$V =$ _____



18. Choose Yes or No to indicate if the given dimensions represent a rectangular prism with a volume of 96 cubic inches.

18a. 2 in. • 6 in. • 8 in. Yes No

18b. 2 in. • 4 in. • 12 in. Yes No

18c. 4 in. • 12 in. • 4 in. Yes No

18d. 3 in. • 4 in. • 9 in. Yes No

18e. 4 in. • 4 in. • 6 in. Yes No

19. What is the volume of a rectangular prism with a base area of 52 square inches and a height of 14 inches? Show your work.

$V =$ _____

20. The volume of a rectangular prism is 6,037.5 cubic inches. The area of the base of the prism is 525 square inches. What is the height of the prism? Show your work.

$h =$ _____

21. John wants to place a layer of mulch on top of his 12 ft by 24 ft vegetable garden. If a 1.5 ft³ bag of mulch costs \$4, how much will it cost to place a 3-inch layer of mulch on the garden? Show your work.

\$ _____
