

Name: _____

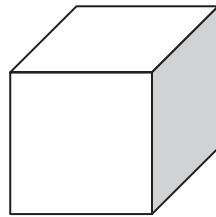
Date: _____

CHAPTER
14

Surface Area and Volume

Worksheet 1 Building Solids Using Unit Cubes

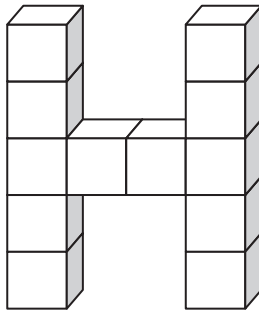
How many unit cubes are used to build each solid?



This is a **unit cube**.

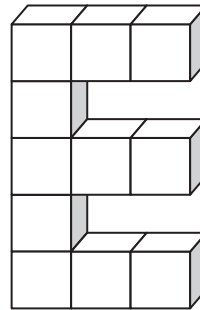


1.



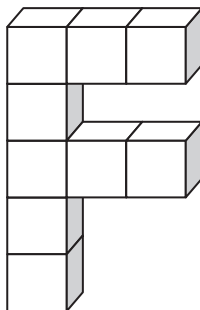
_____ unit cubes

2.



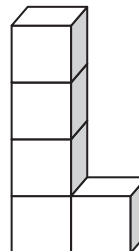
_____ unit cubes

3.



_____ unit cubes

4.

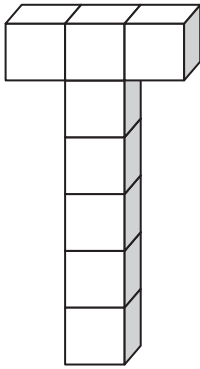


_____ unit cubes

Name: _____

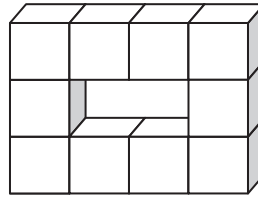
Date: _____

5.



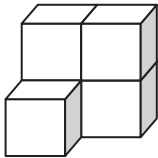
_____ unit cubes

6.



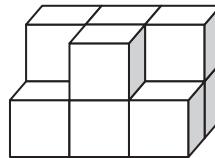
_____ unit cubes

7.



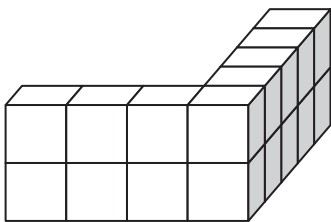
_____ unit cubes

8.



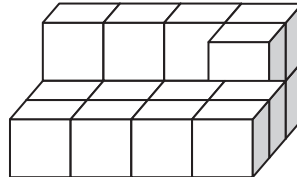
_____ unit cubes

9.



_____ unit cubes

10.



_____ unit cubes

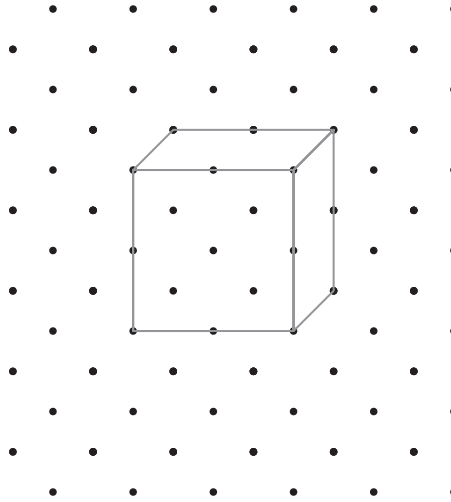
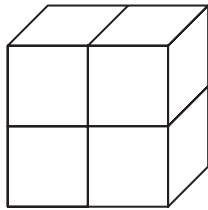
Name: _____

Date: _____

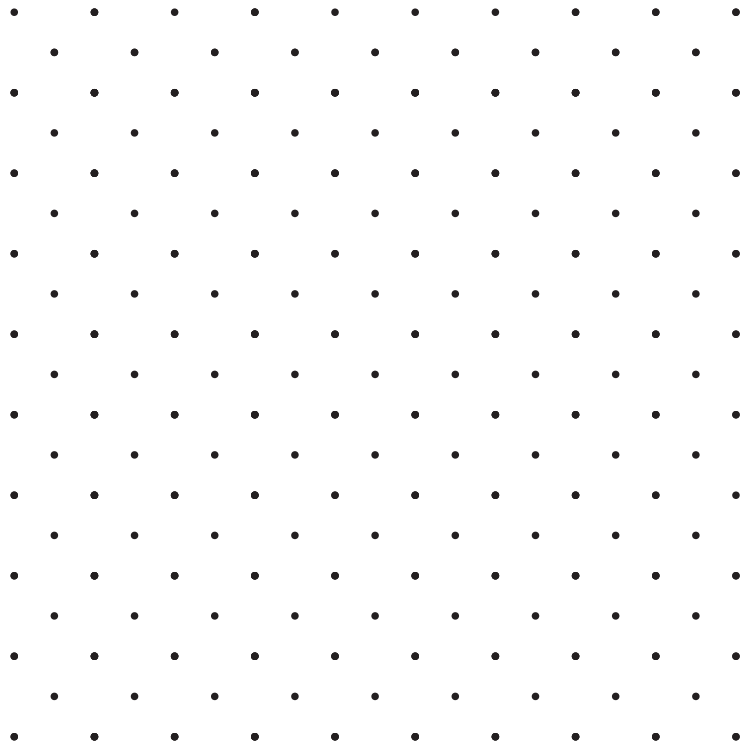
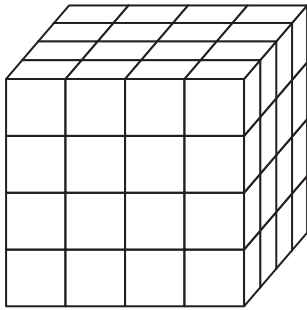
Worksheet 2 Drawing Cubes and Rectangular Prisms

Draw these cubes or rectangular prisms on the dot paper without showing the unit cubes.

Example



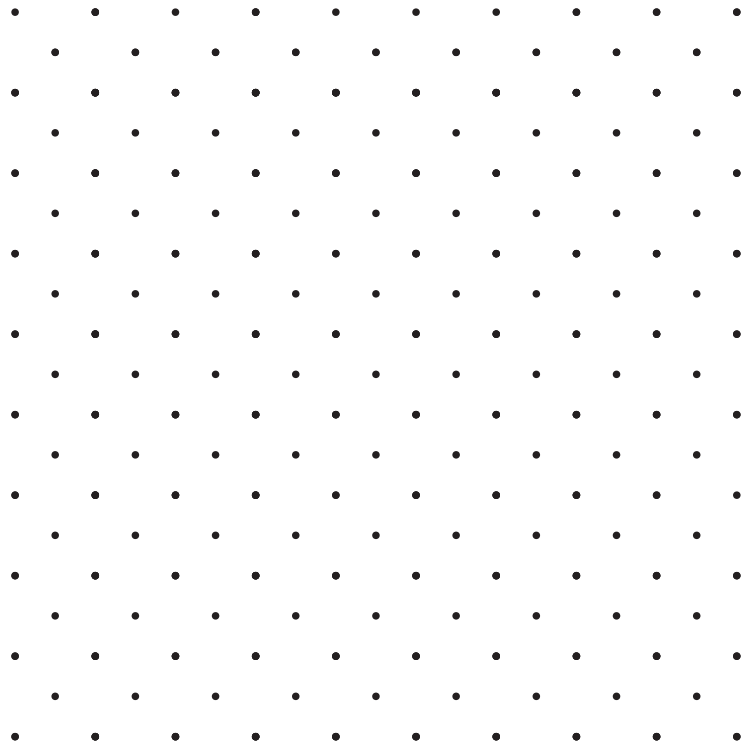
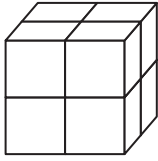
1.



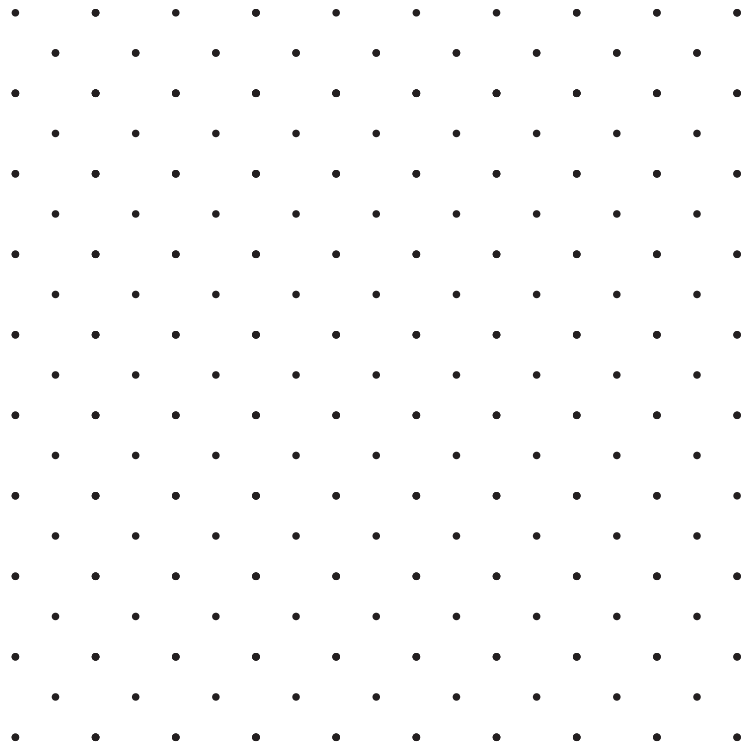
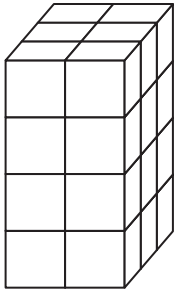
Name: _____

Date: _____

2.



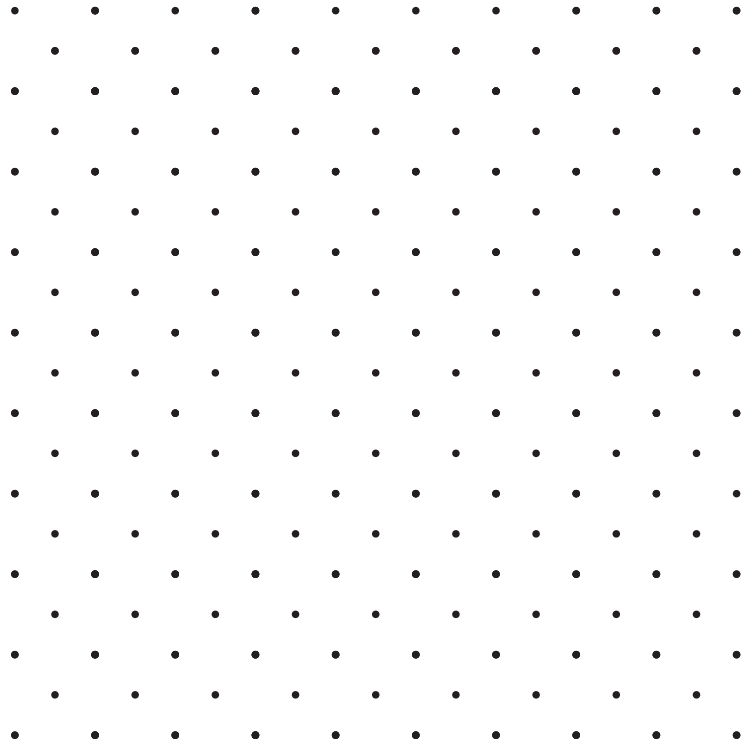
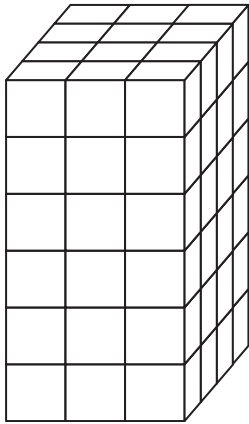
3.



Name: _____

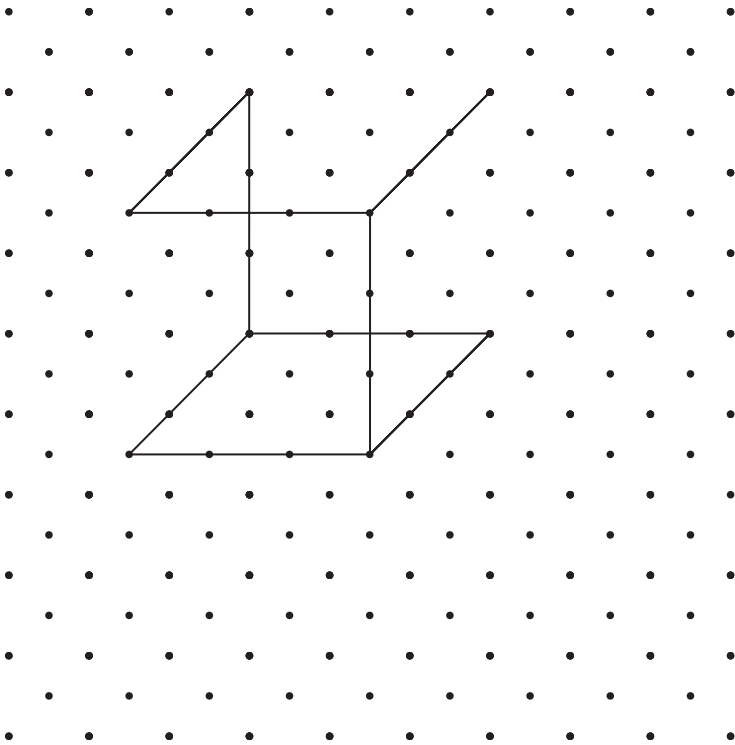
Date: _____

4.



Complete the drawing of each cube or rectangular prism.

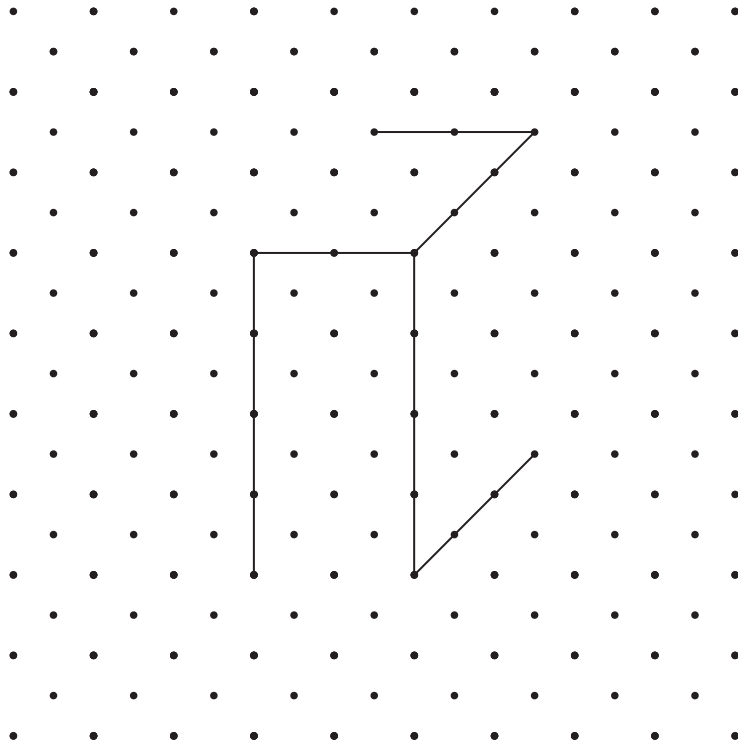
5.



Name: _____

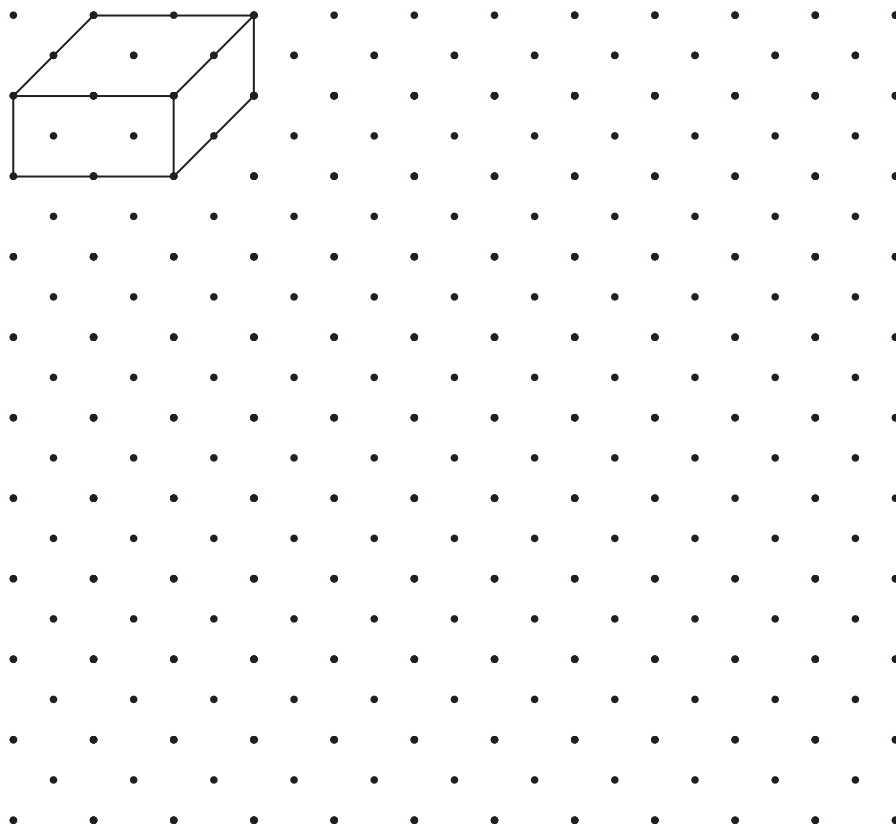
Date: _____

6.



Draw a rectangular prism that has edges 3 times as long as this prism.

7.

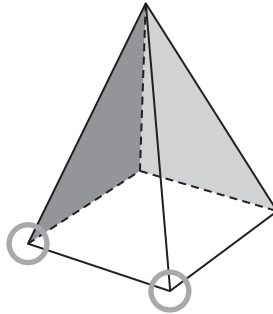
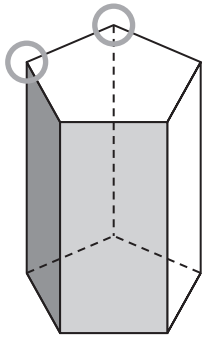


Worksheet 3 Prisms and Pyramids

Complete.

Example

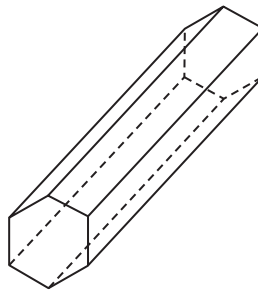
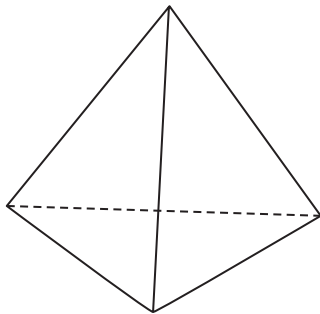
In the figures, circle two vertices and shade two faces gray.



One of the **faces** of the square **pyramid** is a square.



1. In the figures, circle three vertices and color three edges gray.



The **triangular pyramid** has 6 **edges**.



Name: _____

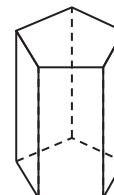
Date: _____

Circle the shape(s) that can be found in the figure.

Example



The **base** of the **pentagonal prism** is a pentagon. The other faces are rectangles.



Triangle

Square

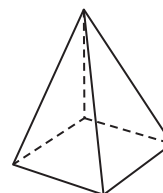
Rectangle

Parallelogram

Pentagon

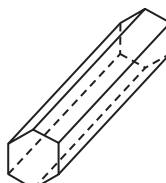
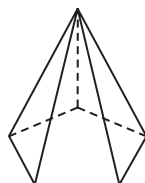
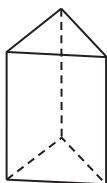
Hexagon

2. Triangle Square Rectangle
Parallelogram Pentagon Hexagon



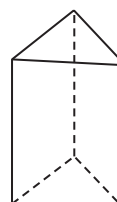
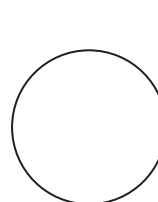
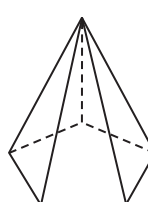
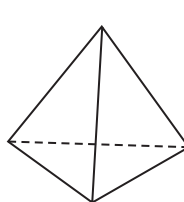
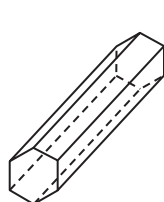
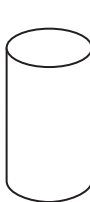
Shade each solid shape if it has two identical and parallel faces.

3.



Put a check in the box if the solid figure is a prism.

4.



Name: _____

Date: _____

Match the names to the solid figures.

5.

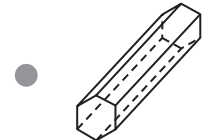
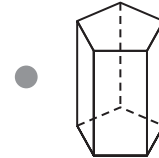
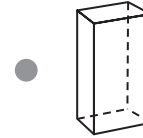
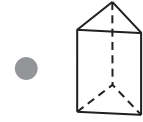
Rectangular prism ●

Pentagonal prism ●

Triangular prism ●

Octagonal prism ●

Hexagonal prism ●



Complete the table.

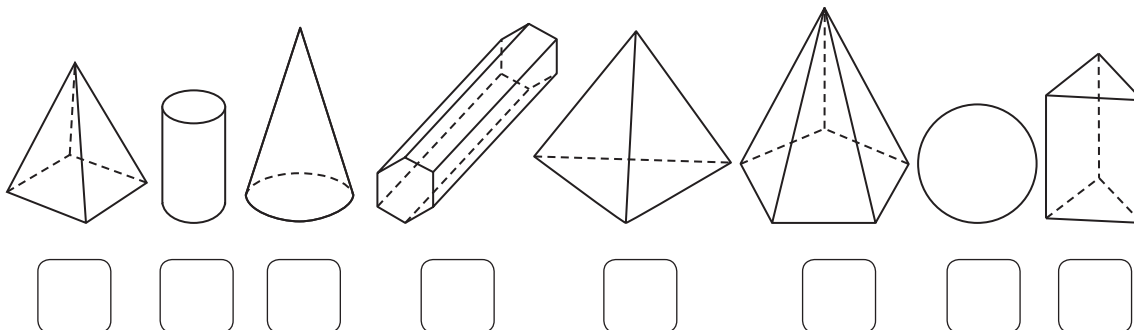
	Type of Prism	Number of Faces	Number of Edges	Number of Vertices
6.	Rectangular			
7.	Pentagonal			
8.	Triangular			
9.	Octagonal			
10.	Hexagonal			

Name: _____

Date: _____

**Put a check in the box if the solid figure is a pyramid.
Shade the base of each pyramid.**

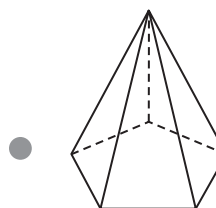
11.



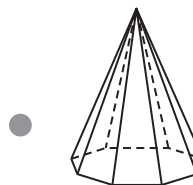
Match the names to the solid figures.

12.

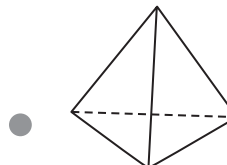
Triangular pyramid ●



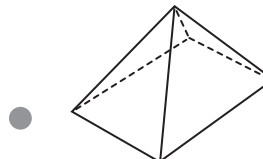
Rectangular pyramid ●



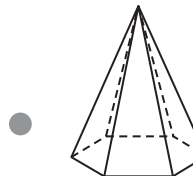
Pentagonal pyramid ●



Hexagonal pyramid ●



Octagonal pyramid ●



Name: _____

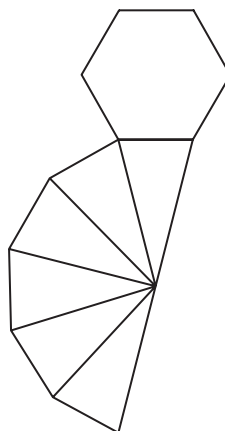
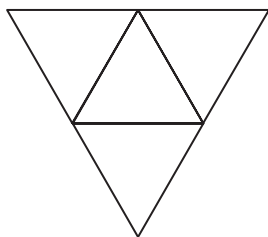
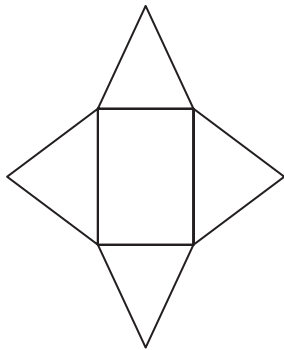
Date: _____

Complete the table.

	Type of Pyramid	Number of Faces	Number of Edges	Number of Vertices
13.	Triangular			
14.	Rectangular			
15.	Pentagonal			
16.	Hexagonal			
17.	Octagonal			

**These are the nets of some pyramids.
Shade the base of each pyramid.**

18.



More than one **net** may form the same solid figure.

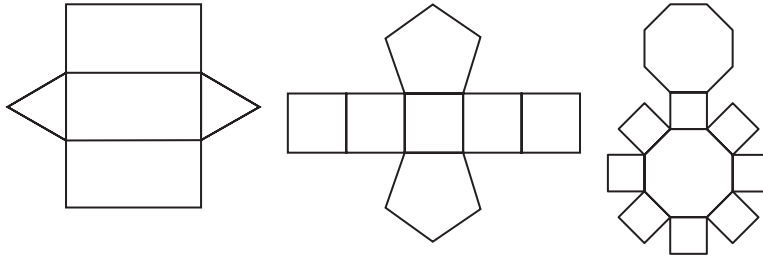


Name: _____

Date: _____

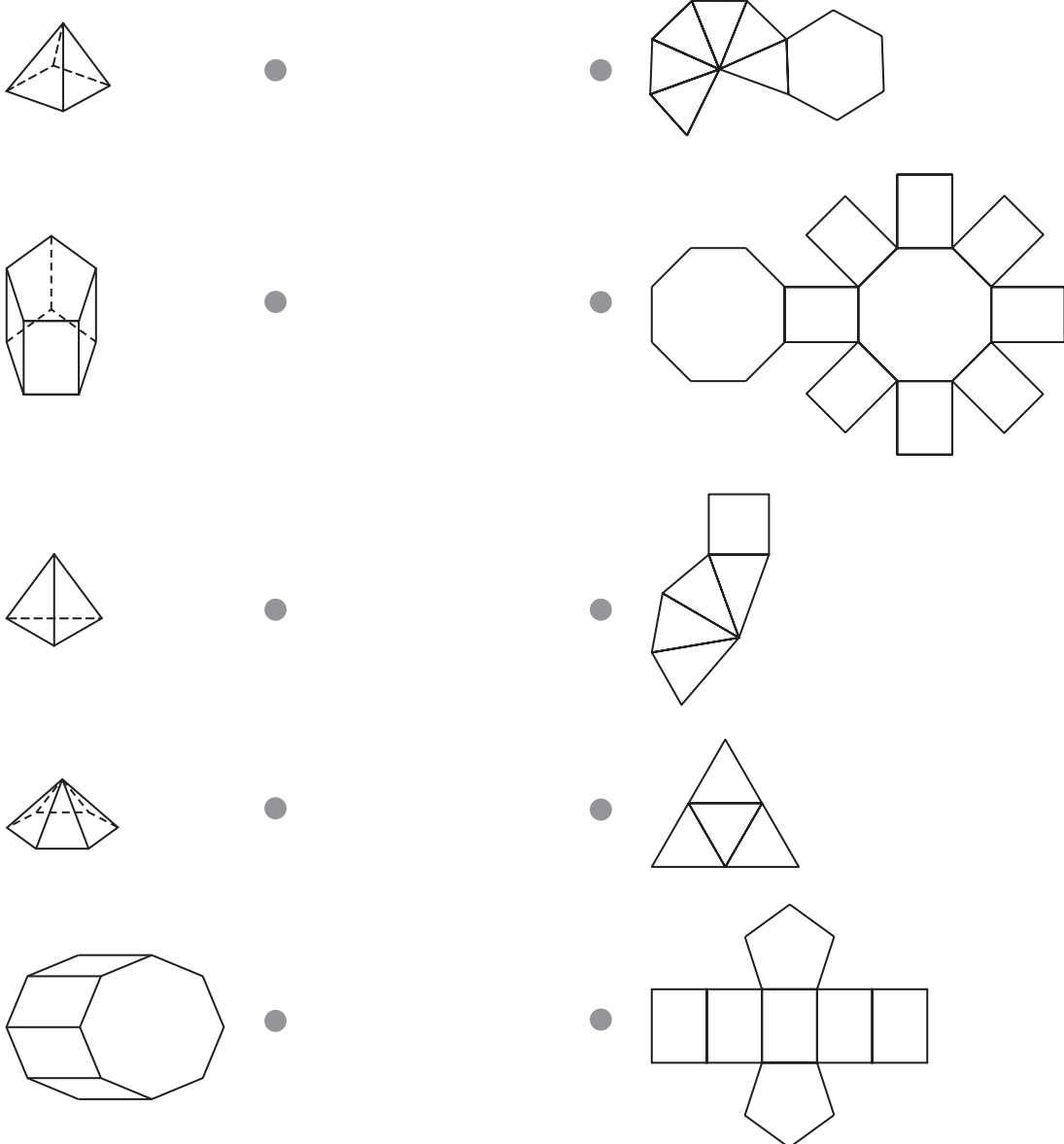
These are the nets of some prisms. Shade the identical and parallel edges of each prism using different colors.

19.



Match the nets with the solid figure they form.

20.

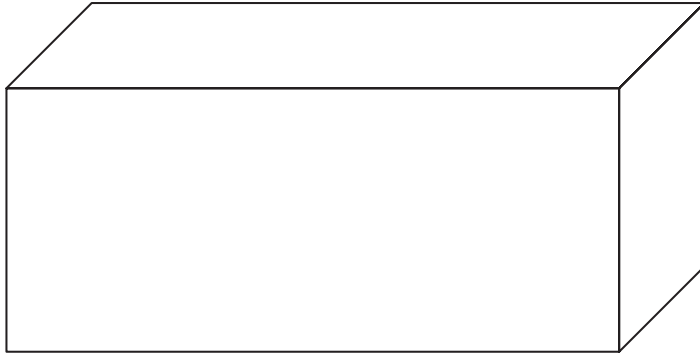


Name: _____

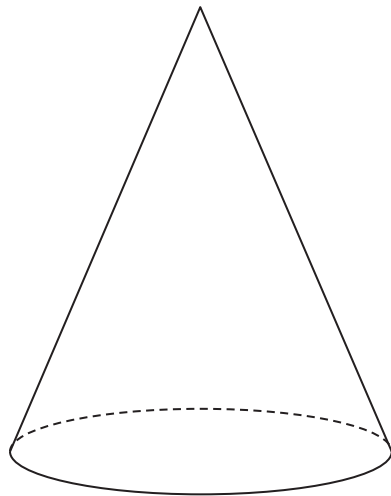
Date: _____

21. Explain the statements.

a. A cube is a rectangular prism.



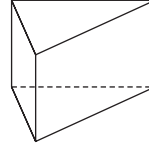
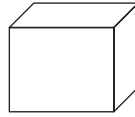
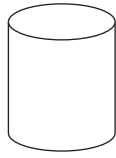
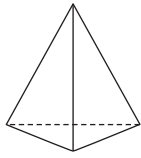
b. A cone is not a prism.



Name: _____

Date: _____

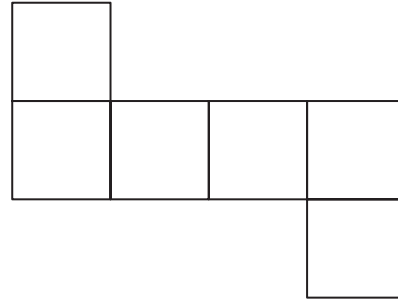
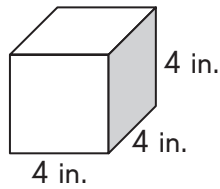
22. For each figure, identify whether or not it is a prism. Explain your reasoning.



Worksheet 4 Nets and Surface Area

Find the surface area of each cube.

Example



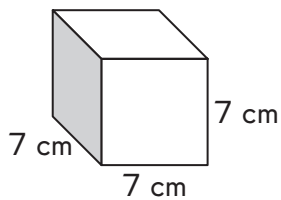
$$\begin{aligned} \text{Area of one square face} &= 4 \times 4 \\ &= 16 \text{ in.}^2 \end{aligned}$$

$$\begin{aligned} \text{Surface area of the cube} &= 6 \times 16 \\ &= 96 \text{ in.}^2 \end{aligned}$$

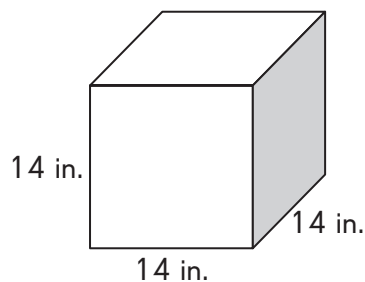
The **surface area** is equal to the sum of the areas of the 6 square faces.

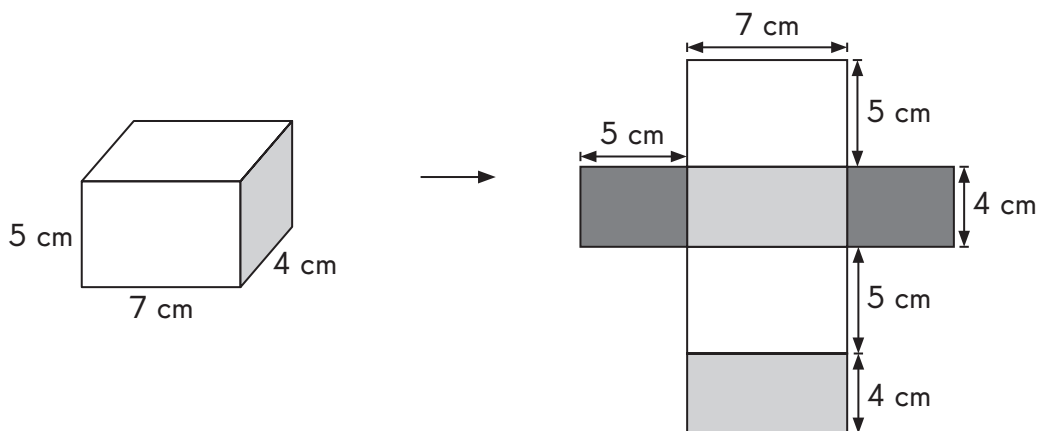


1.



2.



Find the surface area of each rectangular prism.*Example*

$$\begin{aligned} \text{Area of 2 gray rectangles} &= \frac{(7 \times 4)}{\quad} + \frac{(7 \times 4)}{\quad} \\ &= \frac{2}{\quad} \times \frac{(7 \times 4)}{\quad} \\ &= \underline{56 \text{ cm}^2} \end{aligned}$$

$$\begin{aligned} \text{Area of 2 white rectangles} &= \frac{(7 \times 5)}{\quad} + \frac{(7 \times 5)}{\quad} \\ &= \frac{2}{\quad} \times \frac{(7 \times 5)}{\quad} \\ &= \underline{70 \text{ cm}^2} \end{aligned}$$

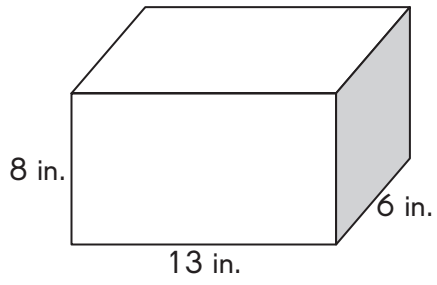
$$\begin{aligned} \text{Area of 2 black rectangles} &= \frac{(5 \times 4)}{\quad} + \frac{(5 \times 4)}{\quad} \\ &= \frac{2}{\quad} \times \frac{(5 \times 4)}{\quad} \\ &= \underline{40 \text{ cm}^2} \end{aligned}$$

$$\begin{aligned} \text{Surface area of the rectangular prism} &= 56 + 70 + 40 \\ &= \underline{166 \text{ cm}^2} \end{aligned}$$

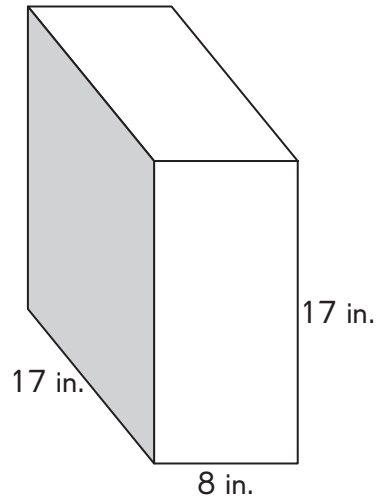
Name: _____

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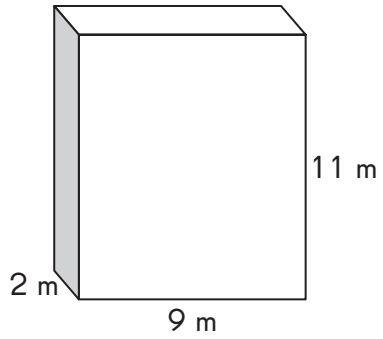
3.



4.



5.

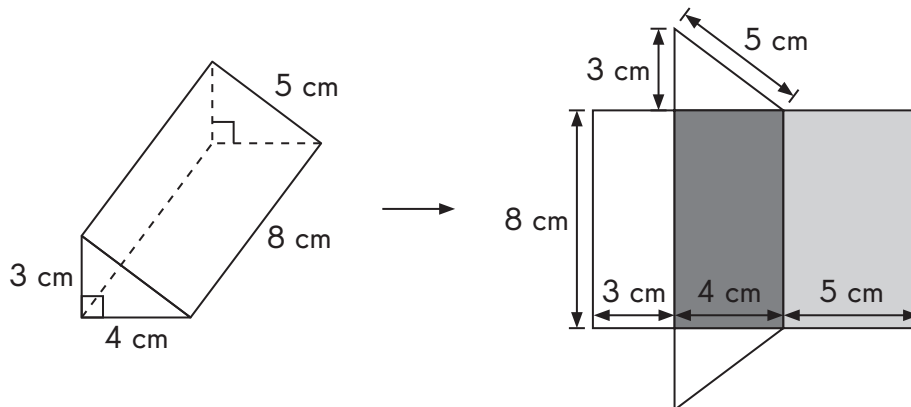


Name: _____

Date: _____

Find the surface area of each triangular prism.

Example



$$\begin{aligned}\text{Area of triangles} &= \underline{2} \times \frac{(\frac{1}{2} \times 3 \times 4)}{\underline{\quad}} \\ &= \underline{2} \times \underline{6} \\ &= \underline{12 \text{ cm}^2}\end{aligned}$$

$$\begin{aligned}\text{Area of white rectangle} &= \underline{8} \times \underline{3} \\ &= \underline{24 \text{ cm}^2}\end{aligned}$$

$$\begin{aligned}\text{Area of black rectangle} &= \underline{8 \times 4} \\ &= \underline{32 \text{ cm}^2}\end{aligned}$$

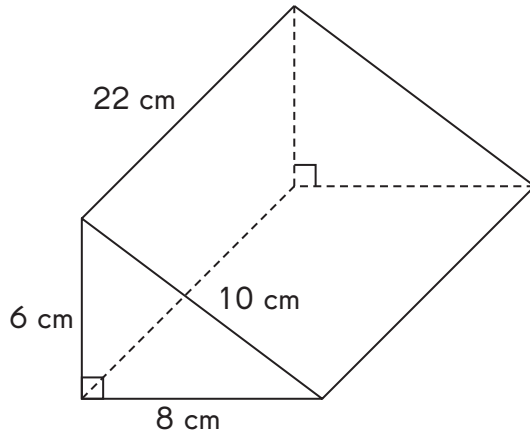
$$\begin{aligned}\text{Area of gray rectangle} &= \underline{8 \times 5} \\ &= \underline{40 \text{ cm}^2}\end{aligned}$$

$$\begin{aligned}\text{Surface area of the triangular prism} &= 12 + 24 + 32 + 40 \\ &= 108 \text{ cm}^2\end{aligned}$$

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Date: _____

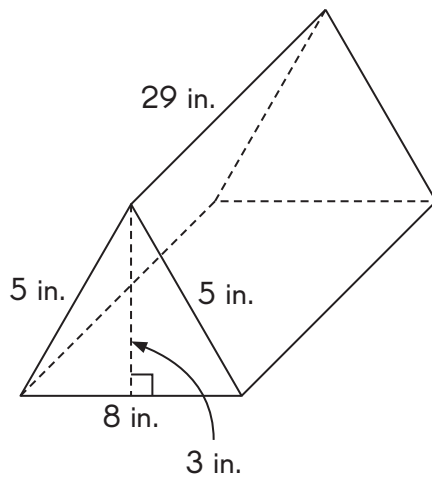
6.



The base of this triangular prism is a **right triangle**.



7.



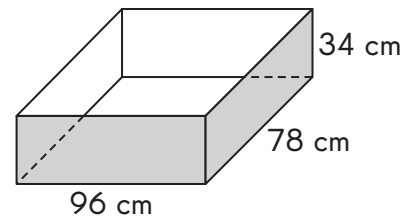
Name: _____

Date: _____

Solve. Show your work.

8. A rectangular cupboard measures 110 centimeters by 85 centimeters by 40 centimeters. What is the surface area of the cupboard?

9. A rectangular display cabinet measures 96 centimeters by 78 centimeters by 34 centimeters. What is the surface area of the outside of the cabinet if it does not have a cover?



10. A rectangular bedroom measures 12 feet by $8\frac{1}{2}$ feet by 7 feet. The rectangular door in the bedroom measures 2 feet by $6\frac{1}{2}$ feet. Joanne decides to paint the walls of the room pink. Find the surface area of the walls in the room.

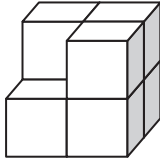
Name: _____

Date: _____

Worksheet 5 Understanding and Measuring Volume

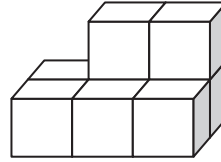
These solids are formed by stacking 1-centimeter cubes. Find the volume of each solid.

1.



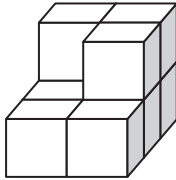
Volume = _____ cm^3

2.



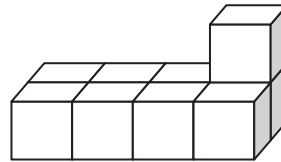
Volume = _____ cm^3

3.



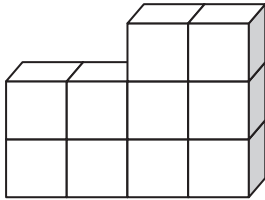
Volume = _____ cm^3

4.



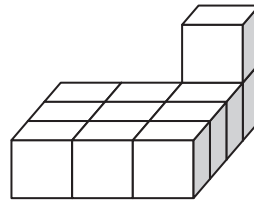
Volume = _____ cm^3

5.



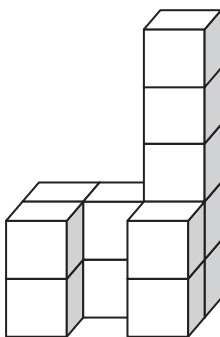
Volume = _____ cm^3

6.



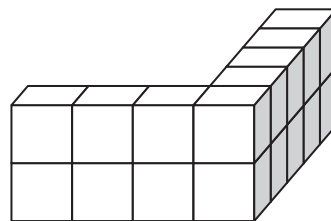
Volume = _____ cm^3

7.



Volume = _____ cm^3

8.



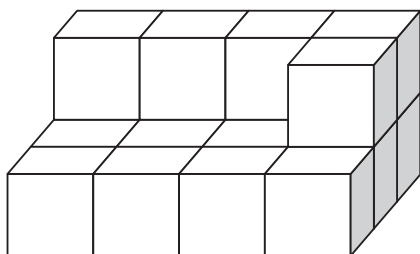
Volume = _____ cm^3

Name: _____

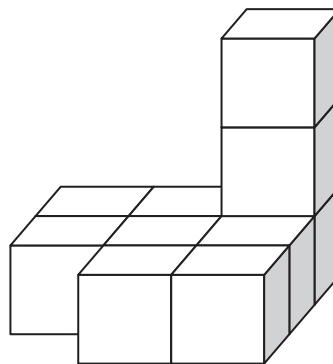
Date: _____

These solids are built using unit cubes. Find the volume of each solid. Then compare the volumes and fill in the blanks.

Example



A



B

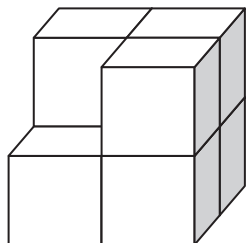
Volume = 17 cubic units

Volume = 10 cubic units

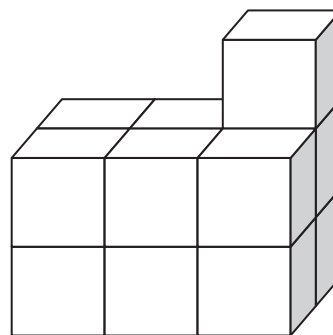
Solid A has a larger **volume** than solid B.

These solids are built using 1-inch cubes. Find the volume of each solid. Then compare their volumes and fill in the blanks.

9.



C



D

Volume = _____ in.³

Volume = _____ in.³

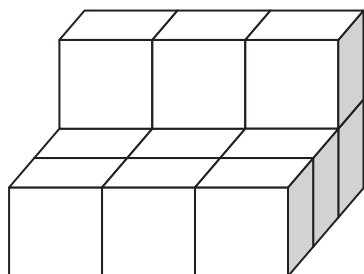
Solid _____ has a lesser volume than solid _____.

Name: _____

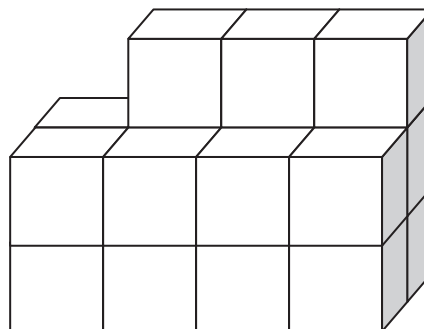
Date: _____

These solids are built using 1-foot cubes. Find the volume of each solid. Then compare their volumes and fill in the blanks.

10.



E



F

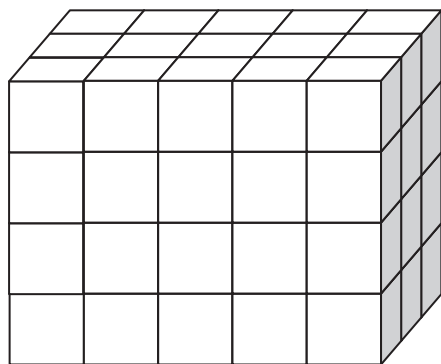
Volume = _____ ft^3

Volume = _____ ft^3

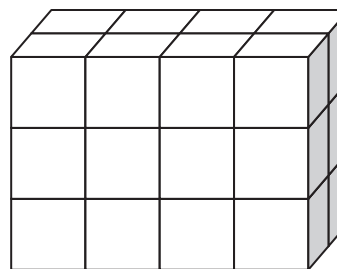
Solid _____ has a larger volume than solid _____.

These solids are built using 1-centimeter cubes. Find the volume of each solid. Then compare their volumes and fill in the blanks.

11.



G



H

Length = _____ cm

Length = _____ cm

Width = _____ cm

Width = _____ cm

Height = _____ cm

Height = _____ cm

Volume = _____ cm^3

Volume = _____ cm^3

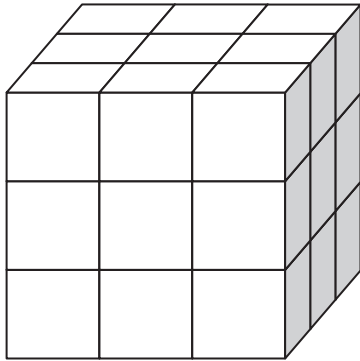
Solid _____ has a larger volume than solid _____.

Name: _____

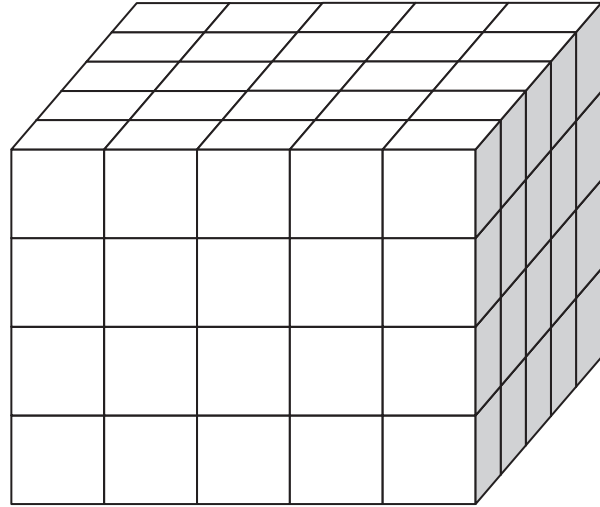
Date: _____

These solids are built using 1-meter cubes. Find the volume of each solid. Then compare their volumes and fill in the blanks.

12.



K



M

Length = _____ m

Width = _____ m

Height = _____ m

Volume = _____ m³

Length = _____ m

Width = _____ m

Height = _____ m

Volume = _____ m³

Solid _____ has a smaller volume than solid _____.

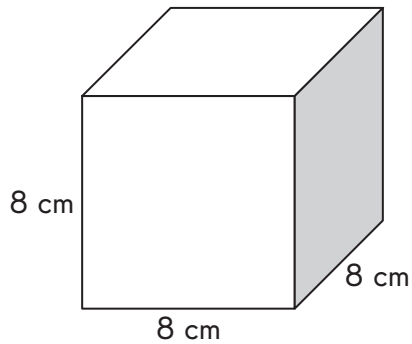
Name: _____

Date: _____

Worksheet 6 Volume of a Rectangular Prism and Liquid

Find the volume of each rectangular prism or cube.

Example



$$\text{Length} = \underline{8} \text{ cm}$$

$$\text{Width} = \underline{8} \text{ cm}$$

$$\text{Height} = \underline{8} \text{ cm}$$

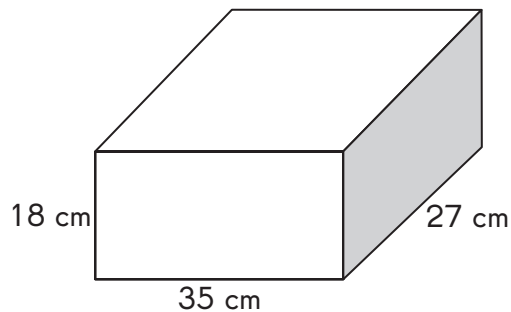
$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

$$= \text{edge} \times \text{edge} \times \text{edge}$$

$$= \underline{8} \times \underline{8} \times \underline{8}$$

$$= \underline{512 \text{ cm}^3}$$

1.

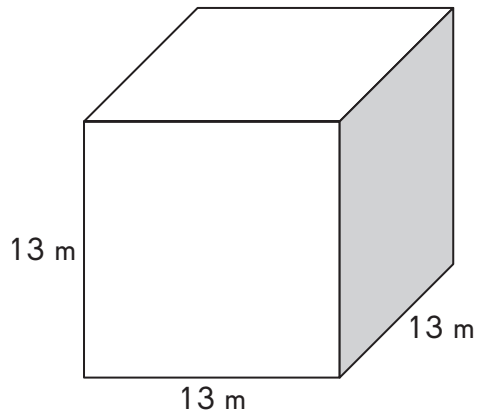


$$\text{Volume} = \underline{\hspace{2cm}}$$

Name: _____

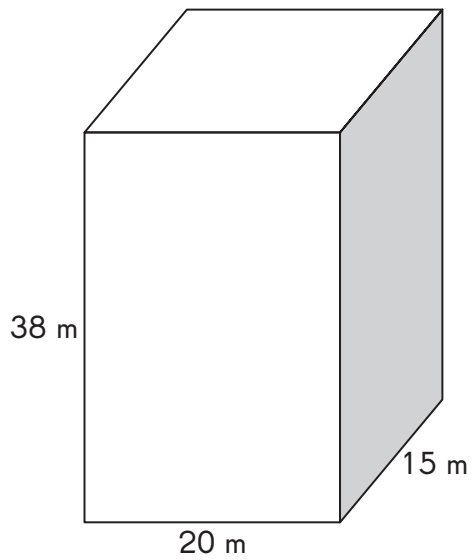
Date: _____

2.



Volume = _____

3.

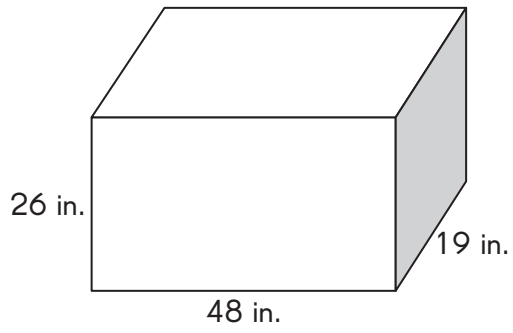


Volume = _____

Name: _____

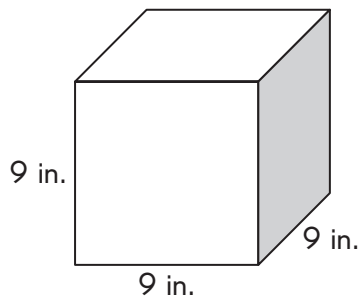
Date: _____

4.



Volume = _____

5.

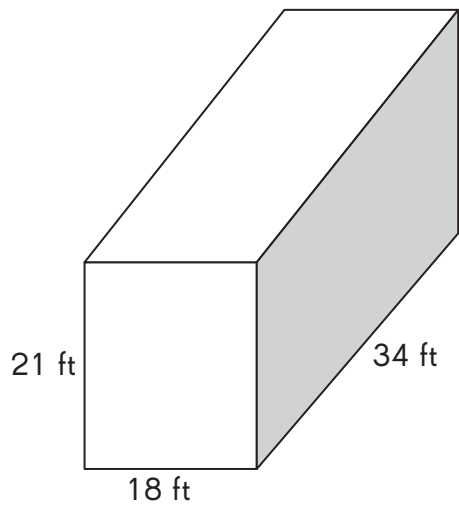


Volume = _____

Name: _____

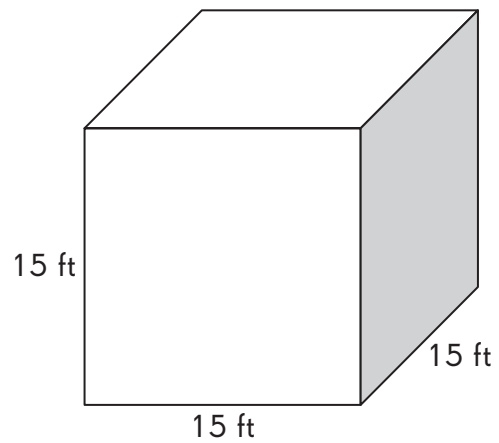
Date: _____

6.



Volume = _____

7.



Volume = _____

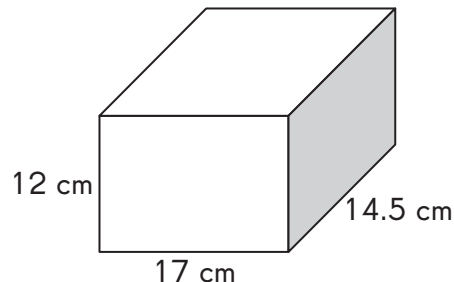
Name: _____

Date: _____

Solve. Show your work.

Example

Steven fills a rectangular container measuring 17 centimeters by 14.5 centimeters by 12 centimeters with orange juice. How many liters and milliliters of orange juice are in the container?



Volume of orange juice in the container

$$= 17 \text{ cm} \times 14.5 \text{ cm} \times 12 \text{ cm}$$

$$= 2,958 \text{ cm}^3$$

$$= 2,958 \text{ mL}$$

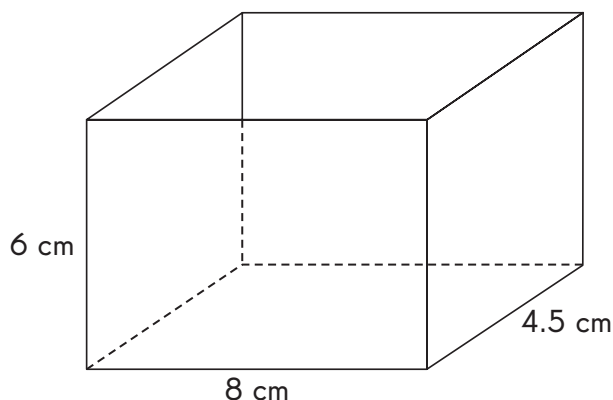
$$= 2 \text{ L } 958 \text{ mL}$$

The **capacity** of a container is the liquid volume of the container.



Remember that $1 \text{ cm}^3 = 1 \text{ mL}$.

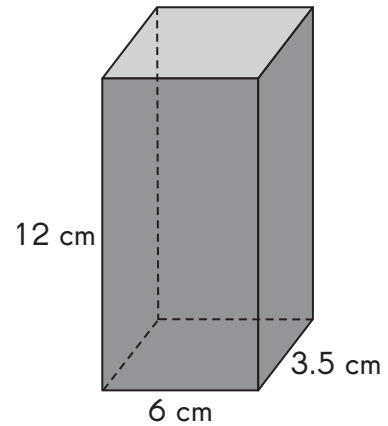
8. The base of a miniature rectangular fish tank measures 8 centimeters by 4.5 centimeters. The height of the tank is 6 centimeters. Find the capacity of the tank in liters and milliliters.



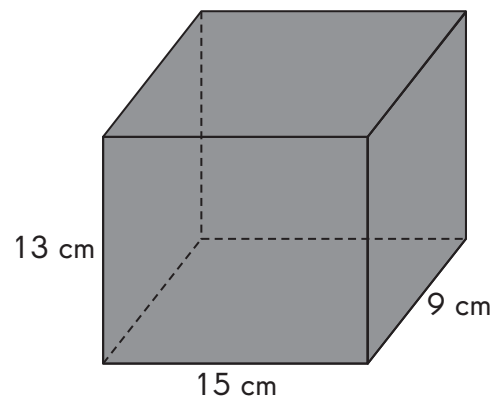
Name: _____

Date: _____

9. A rectangular container measures 6 centimeters by 3.5 centimeters by 12 centimeters. It is completely filled with water. How many liters and milliliters of water are in the container?



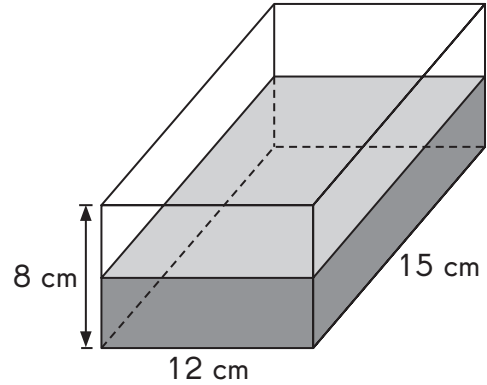
10. A rectangular box measures 15 centimeters by 9 centimeters by 13 centimeters. Shannon uses the box to mix glue for her project. She fills the entire box with glue. How many liters and milliliters of glue are in the box?



Name: _____

Date: _____

- 11.** A rectangular container is $\frac{1}{2}$ -filled with water. How much water is needed to fill the container? After the container is filled, how much water must be poured out so that the container is $\frac{1}{3}$ full?

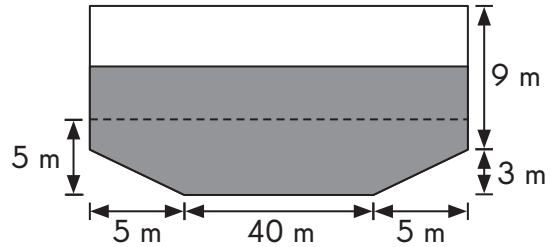


- 12.** A tank is $\frac{1}{2}$ -filled with water. Some of the water is then poured into 8 small containers each with a capacity of 27 cubic centimeters. The tank is now $\frac{1}{4}$ full. What is the capacity of the tank?

Name: _____

Date: _____

- 13.** A swimming pool, 25 meters wide, 50 meters long, and 12 meters deep, is $\frac{2}{3}$ -filled with water. Its cross section is as shown below. How much water must be drained off so that the water level falls to 5 meters?



- 14.** Complete the statements.

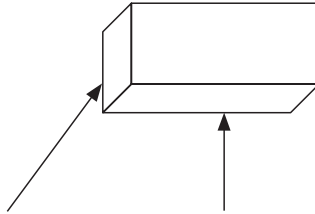
a. Volume of a rectangular prism = length \times _____ \times _____

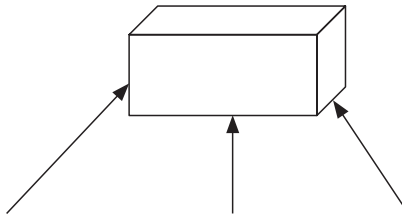
b. Volume of a cube = _____ \times width \times _____

Name: _____

Date: _____

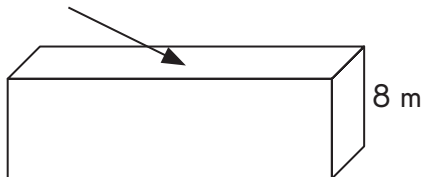
- 15.** Label the two rectangular prisms.
Fill in the blanks with length, width and height.





- 16.** In the diagram, the base = 63 m^2 and height = 8 m . Find the volume of the rectangular prism.

$B = 63 \text{ m}^2$

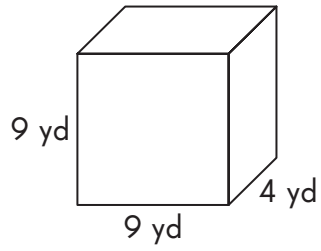


Volume = _____ cubic meters.

Name: _____

Date: _____

17. Find the volume of the prism.



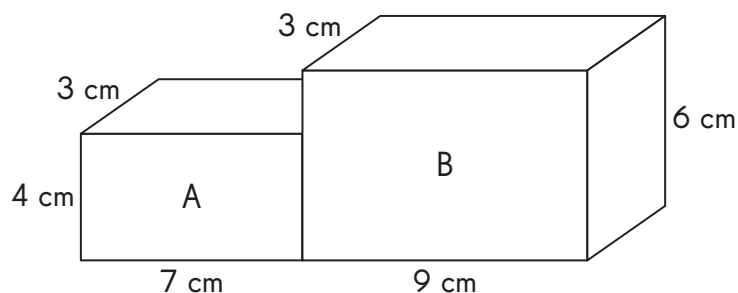
Volume = _____

Worksheet 7 Volume of Composite Solids

Complete.

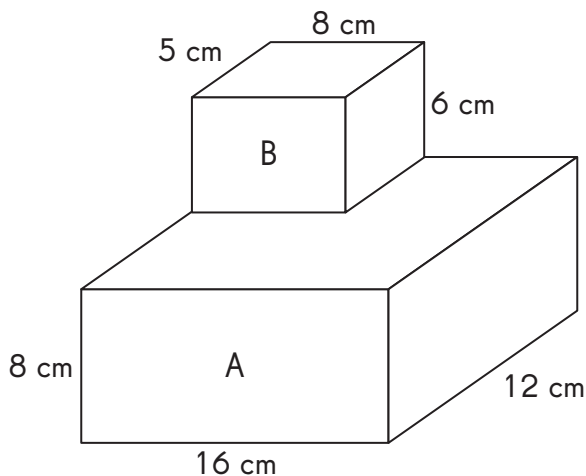
Example

A solid is made from two rectangular prisms. Find the volume of the solid.



- a. Volume of prism A = $\underline{3} \times \underline{4} \times \underline{7} = \underline{84} \text{ cm}^3$
- b. Volume of prism B = $\underline{3} \times \underline{6} \times \underline{9} = \underline{162} \text{ cm}^3$
- c. Volume of the solid = $\underline{84} + \underline{162} = \underline{246} \text{ cm}^3$

1. A solid is made from two rectangular prisms.
Find the total volume of the solid.



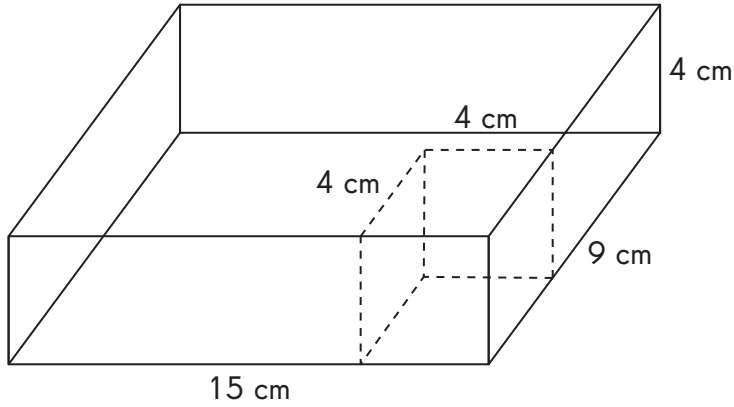
- a. Volume of prism A = _____ \times _____ \times _____ = _____ cm^3
- b. Volume of prism B = _____ \times _____ \times _____ = _____ cm^3
- c. Volume of the solid = _____ + _____ = _____ cm^3

Name: _____

Date: _____

Solve. Show your work.

2. Find the volume of the rectangular prism after a cube is removed from it.



3. Find the volume of the solid which is made up of two prisms.

