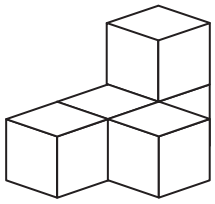
Name: _____ Date: _____

Chapter 15 Surface Area and Volume

Practice 1 Building Solids Using Unit Cubes

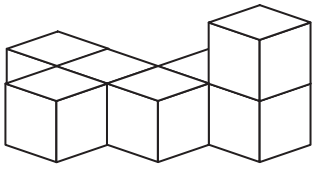
Find the number of unit cubes used to build each solid.

1.



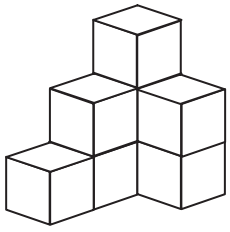
_____ unit cubes

2.



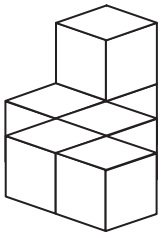
_____ unit cubes

3.



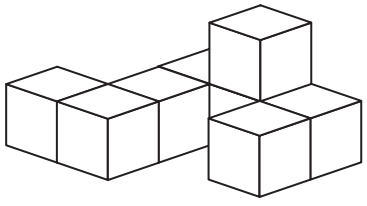
_____ unit cubes

4.



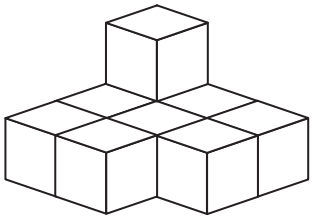
_____ unit cubes

5.



_____ unit cubes

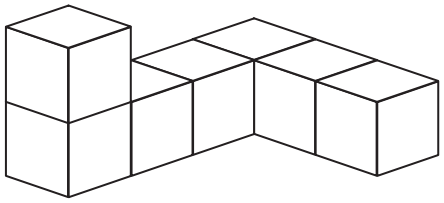
6.



_____ unit cubes

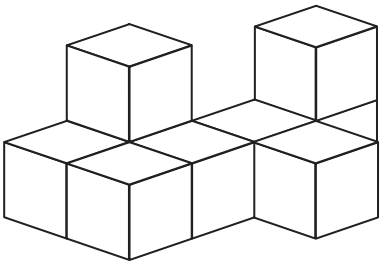
Find the number of unit cubes used to build each solid.

7.



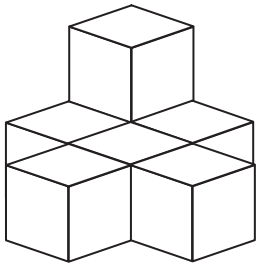
_____ unit cubes

8.



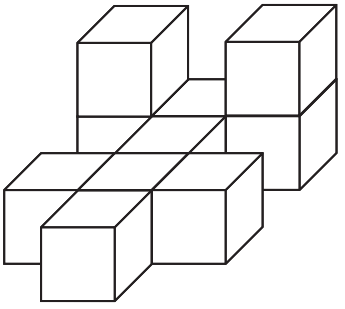
_____ unit cubes

9.



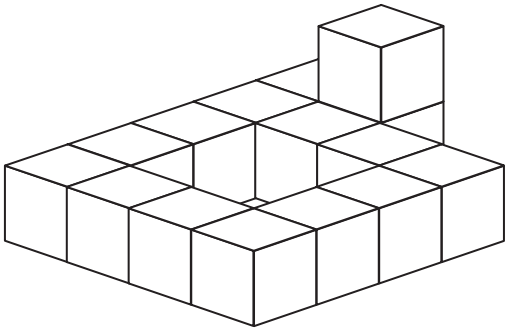
_____ unit cubes

10.



_____ unit cubes

11.



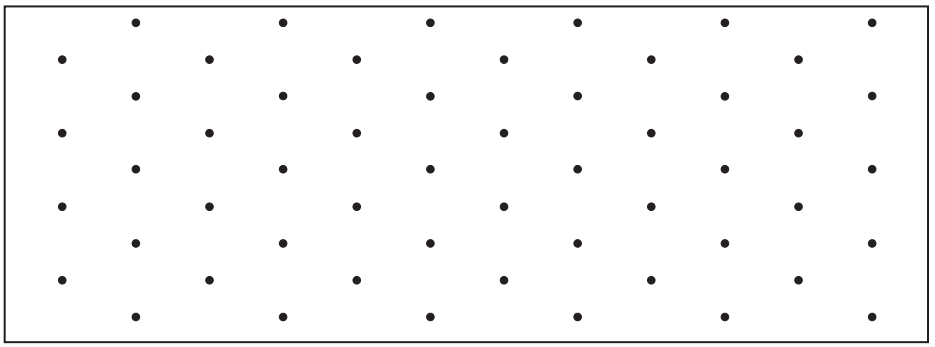
_____ unit cubes

Name: _____ Date: _____

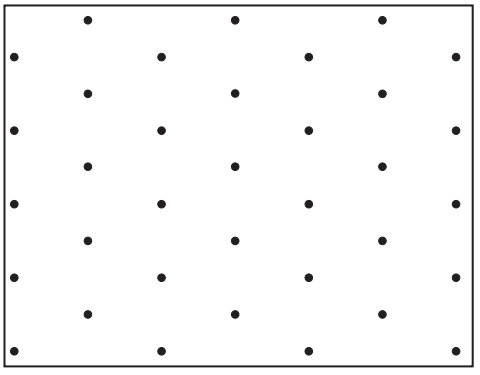
Practice 2 Drawing Cubes and Rectangular Prisms

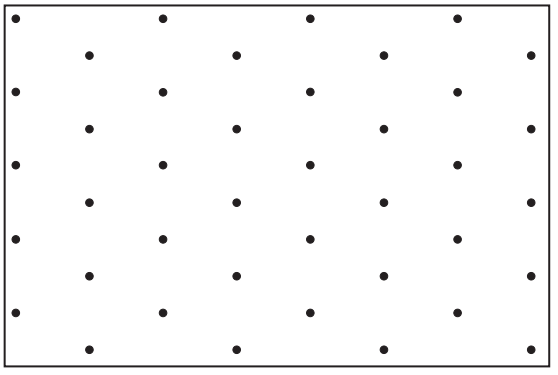
Draw on dot paper.

1. Draw a unit cube.

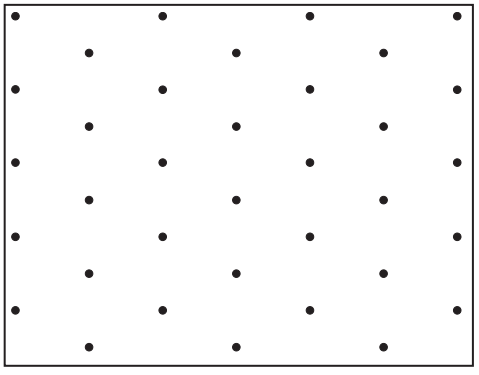


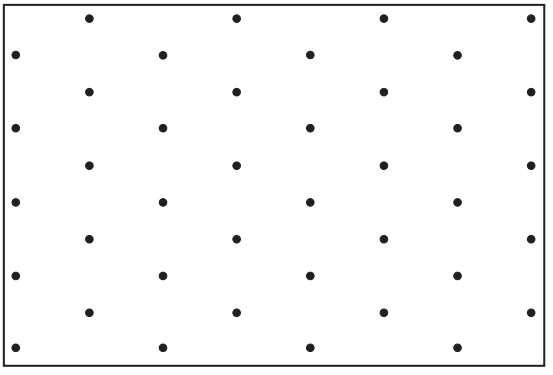
2. Draw two different views of a rectangular prism made up of 2 unit cubes.





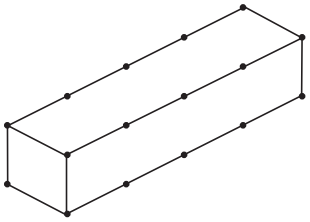
3. Draw two different solids made up of 3 unit cubes each.

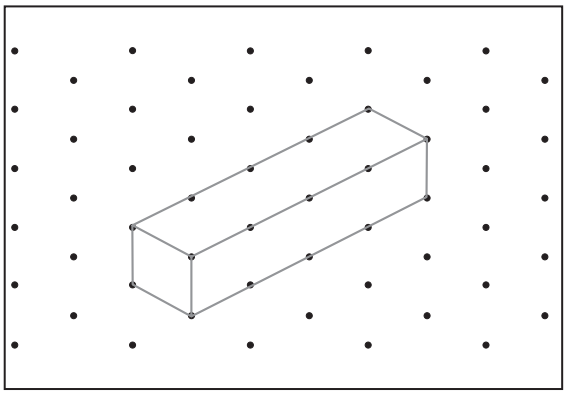




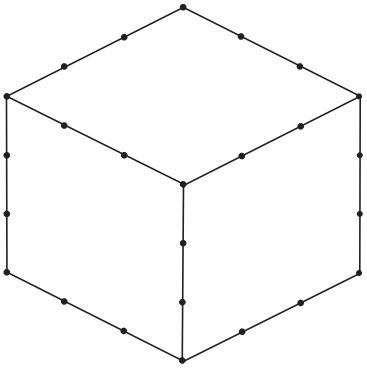
Draw each cube or rectangular prism on the dot paper.

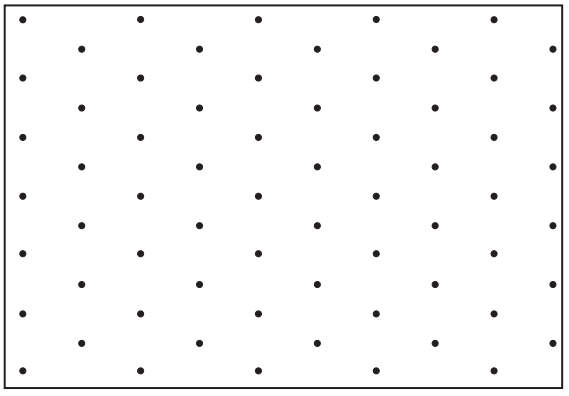
Example



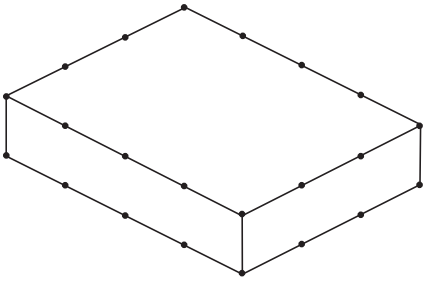


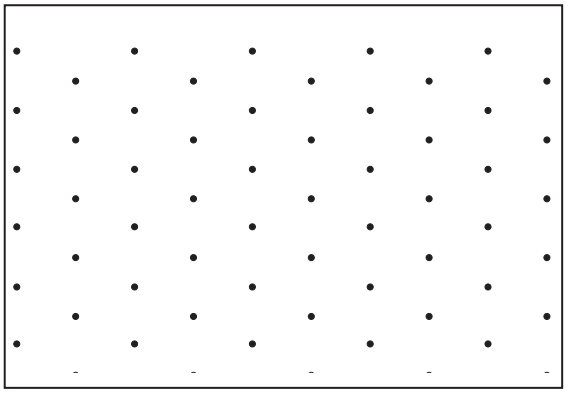
4.



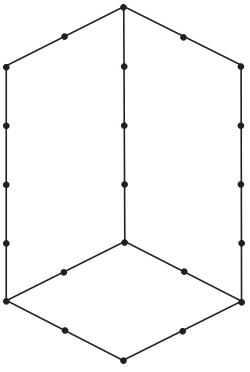


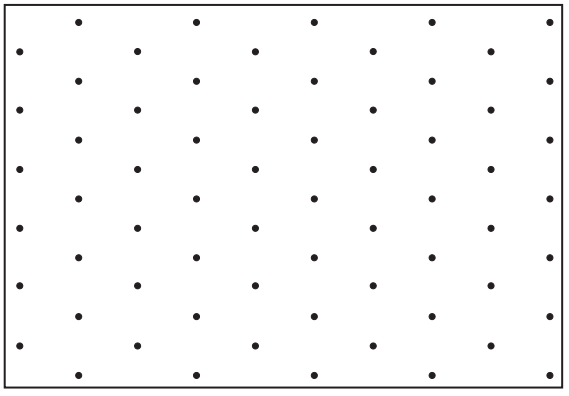
5.





6.

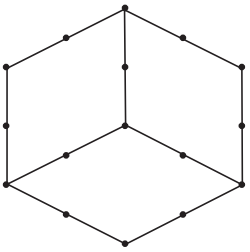




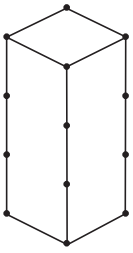
Name: _____ Date: _____

Draw each cube or rectangular prism on the dot paper.

7.

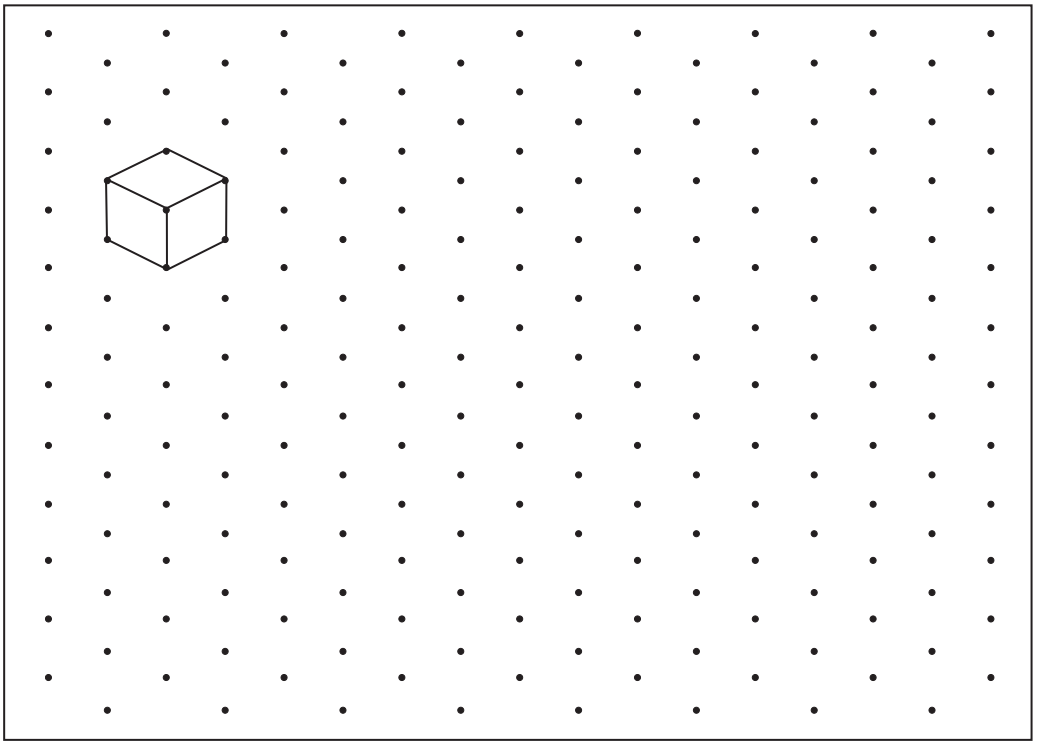


8.



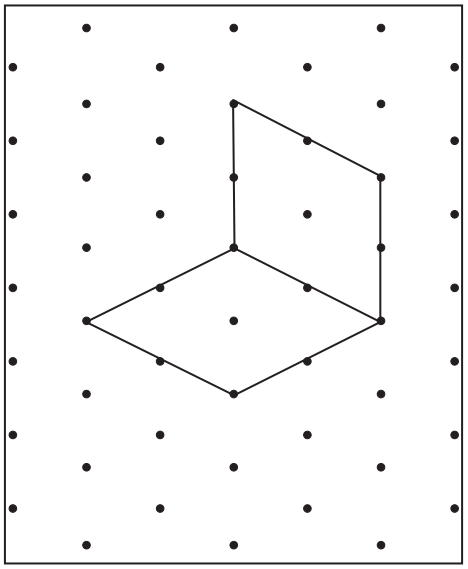
Draw a cube with edges 4 times as long as the edges of this unit cube.

9.

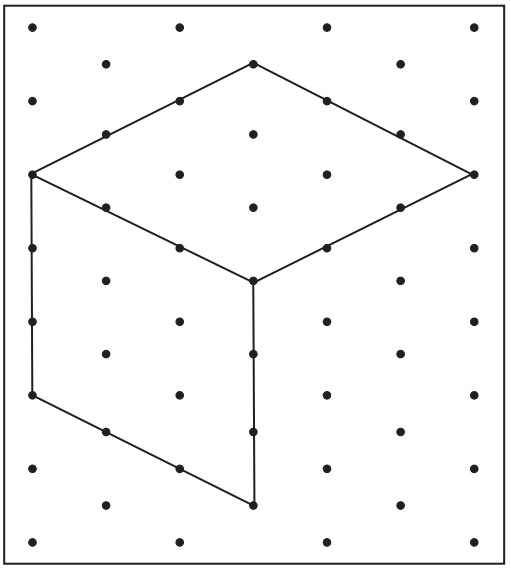


Complete the drawing of each cube or rectangular prism.

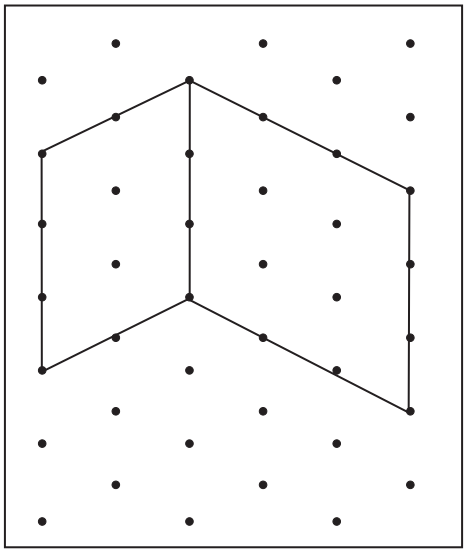
10.



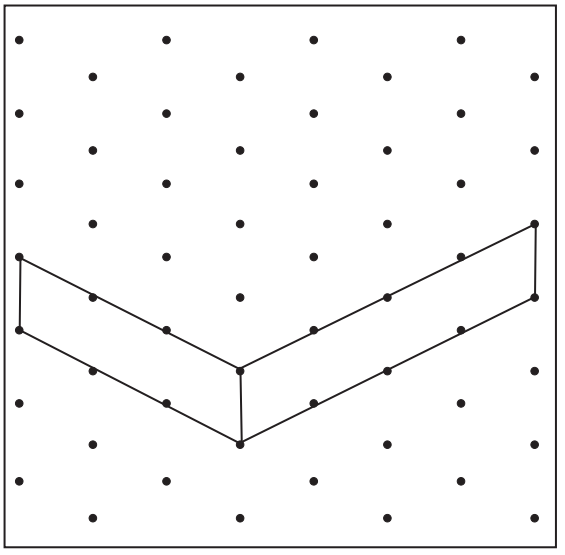
11.



12.



13.

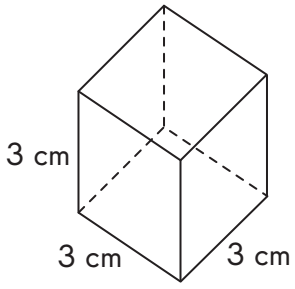


Name: _____ Date: _____

Practice 3 Nets and Surface Area

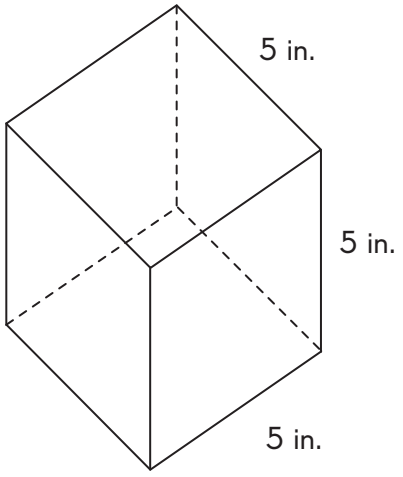
Find the surface area of each cube.

Example

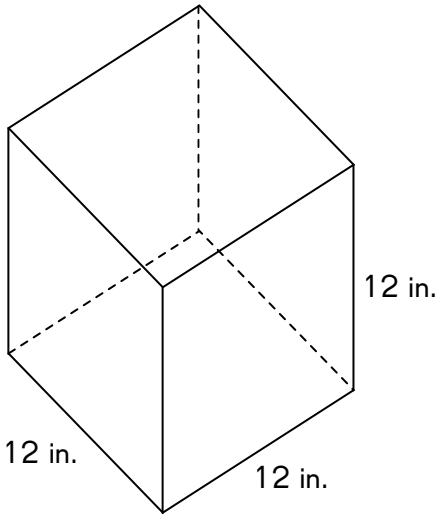


$3 \times 3 = 9$
$6 \times 9 = 54$
Surface area of cube = $54\ cm^2$

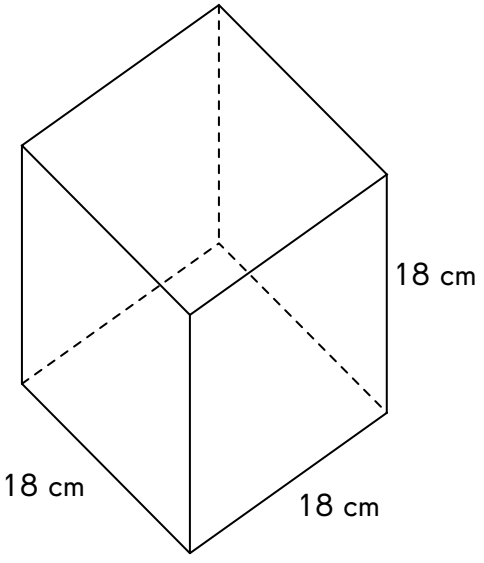
1.



2.

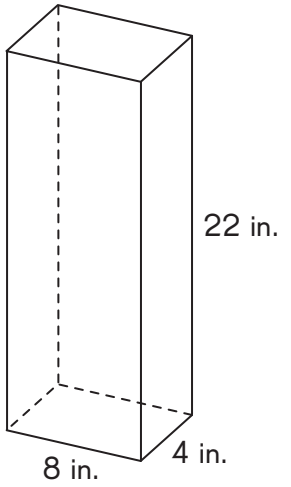


3.



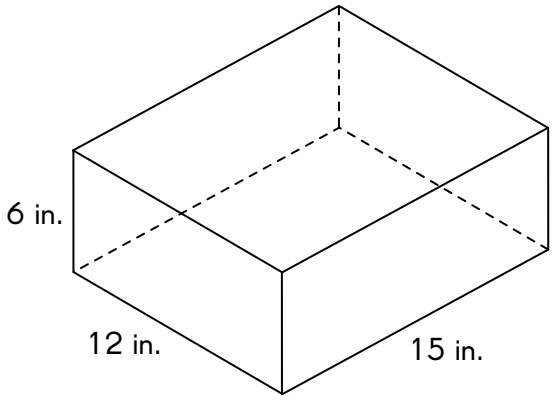
Find the surface area of each rectangular prism.

Example

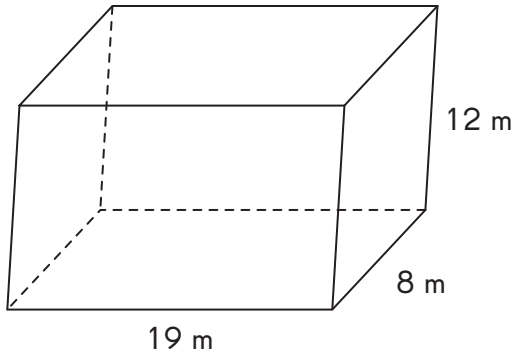


$2 \times 8 \times 4 = 64$
$2 \times 22 \times 4 = 176$
$2 \times 22 \times 8 = 352$
$64 + 176 + 352 = 592$
Surface area of rectangular prism = 592 in.^{2}

4.



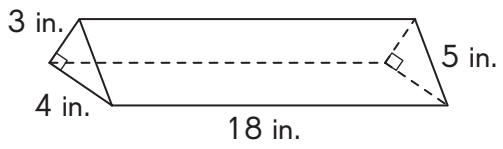
5.



Name: _____ Date: _____

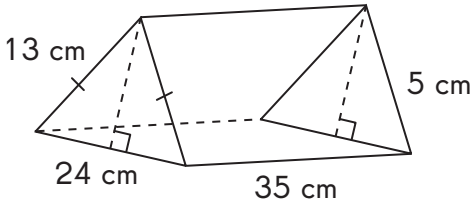
Find the surface area of each triangular prism.

Example



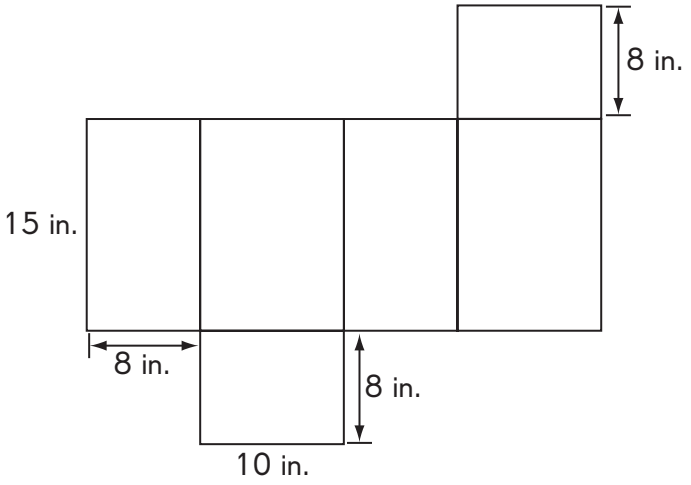
$2 \times \frac{1}{2} \times 3 \times 4 = 12$
$4 \times 18 = 72$
$3 \times 18 = 54$
$5 \times 18 = 90$
$12 + 72 + 54 + 90 = 228$
Surface area of triangular prism
$= 228 \text{ in.}^2$

6.



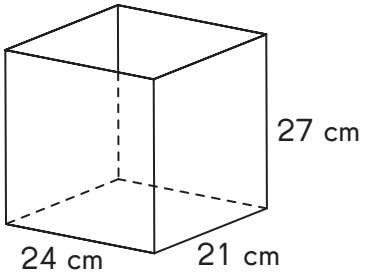
Solve. Show your work.

7. Jeffrey cuts out the net of a box he wants to make. Find the surface area of the box.

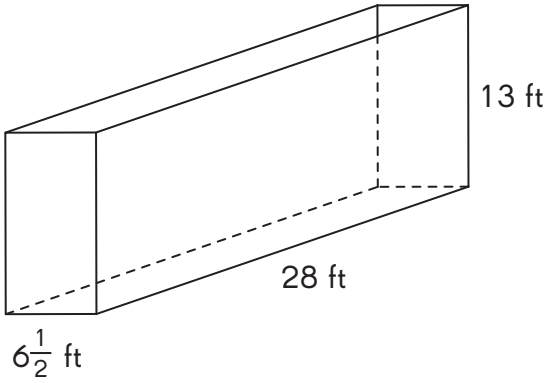


Solve. Show your work.

8. This glass fish tank does not have a cover. Find the total area of the glass panels used to make the tank.



9. The tank shown is made of steel. It does not have a cover.
Find the area of steel sheet used to make the tank.



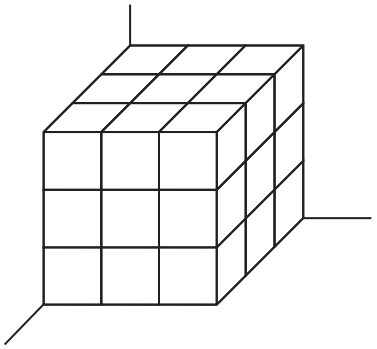
10. A rectangular piece of poster board measures 60 centimeters by 80 centimeters. Linn draws the net of a box on the poster board and cuts it out. If the box measures 10 centimeters by 16 centimeters by 27 centimeters, what is the area of the poster board left?

Name: _____ Date: _____

Practice 4 Understanding and Measuring Volume

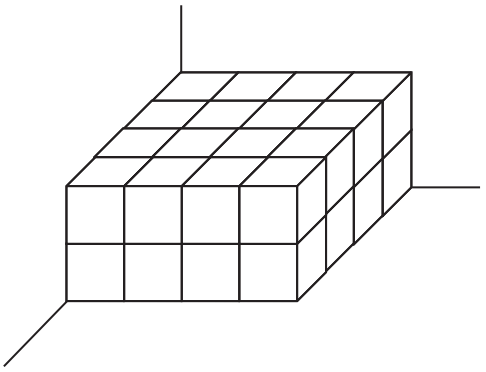
These solids are formed by stacking unit cubes in the corner of a room. Find the volume of each solid.

1.



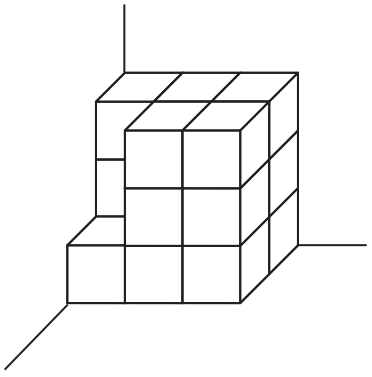
Volume = _____ cubic units

2.



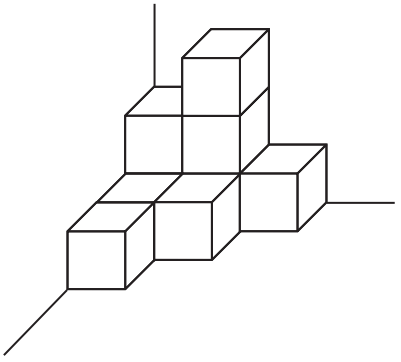
Volume = _____ cubic units

3.



Volume = _____ cubic units

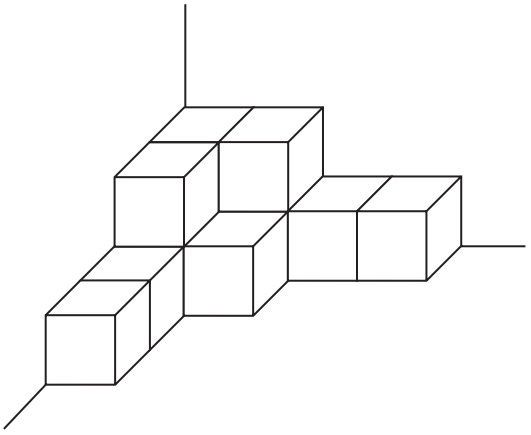
4.



Volume = _____ cubic units

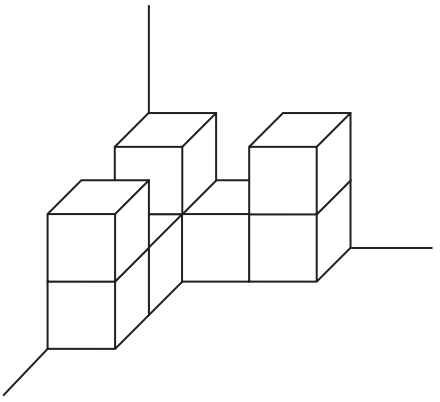
These solids are formed by stacking 1-centimeter cubes in the corner of a room. Find the volume of each solid.

5.



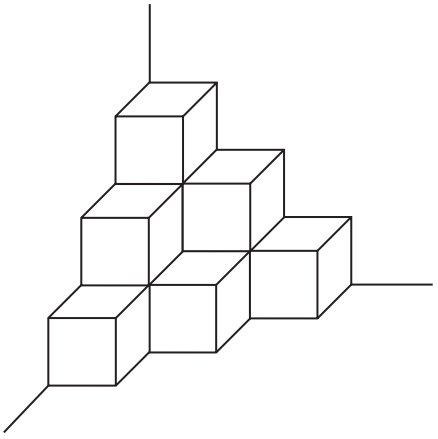
Volume = _____ cm^3

6.



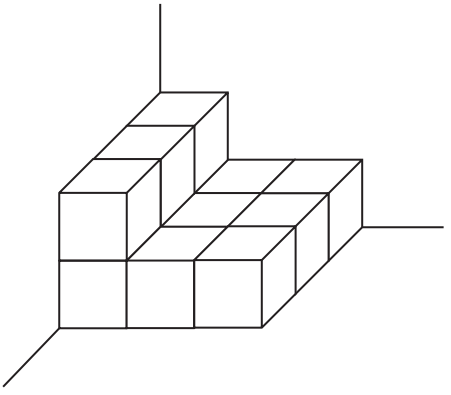
Volume = _____ cm^3

7.



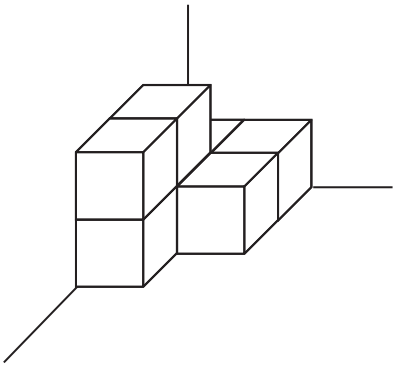
Volume = _____ cm^3

8.



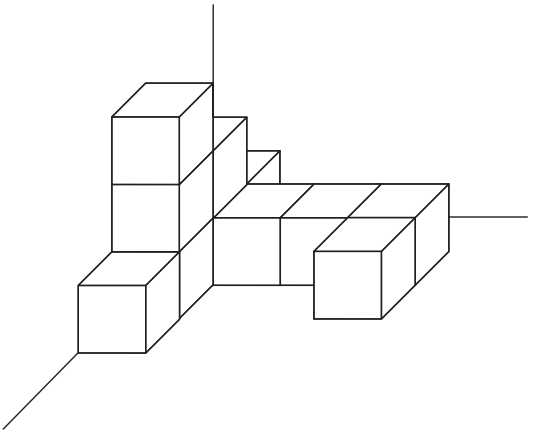
Volume = _____ cm^3

9.



Volume = _____ cm^3

10.

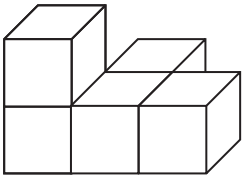


Volume = _____ cm^3

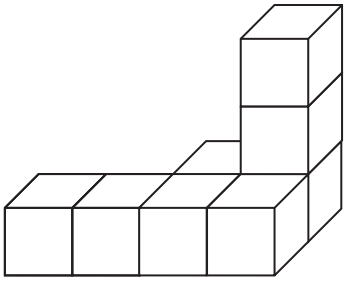
Name: _____ Date: _____

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

11.



A



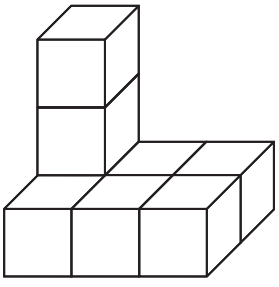
B

Volume = _____ cm^3 Volume = _____ cm^3

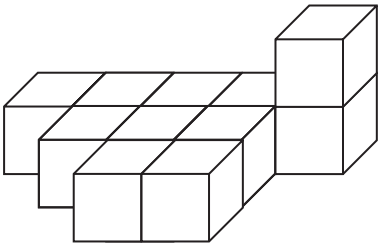
Solid _____ has a greater volume than solid _____.

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

12.



C



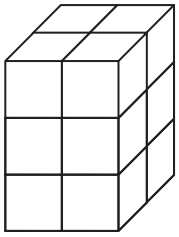
D

Volume = _____ m^3 Volume = _____ m^3

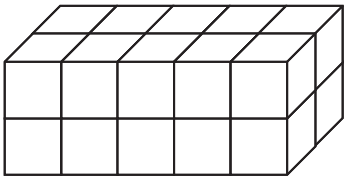
Solid _____ has a lesser volume than solid _____.

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

13.



E



F

Length = _____ in.

Width = _____ in.

Height = _____ in.

Volume = _____ $in.^3$

Length = _____ in.

Width = _____ in.

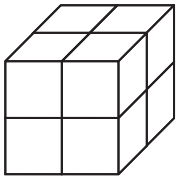
Height = _____ in.

Volume = _____ $in.^3$

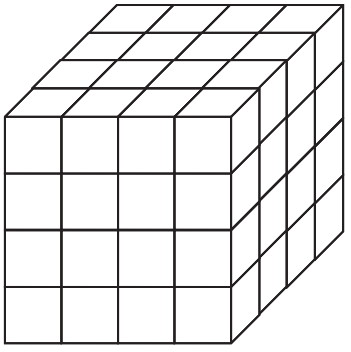
Solid _____ has a lesser volume than solid _____.

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

14.



G



H

Length = _____ ft

Width = _____ ft

Height = _____ ft

Volume = _____ ft^3

Length = _____ ft

Width = _____ ft

Height = _____ ft

Volume = _____ ft^3

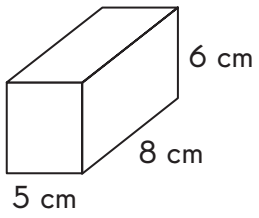
Solid _____ has a greater volume than solid _____.

Name: _____ **Date:** _____

Practice 5 Volume of a Rectangular Prism and Liquid

Write the length, width, and height of each rectangular prism or cube.

Example

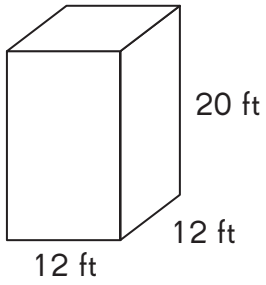


Length = 8 cm

Width = 5 cm

Height = 6 cm

1.

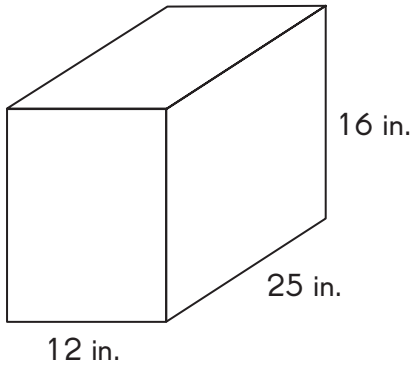


Length = _____ ft

Width = _____ ft

Height = _____ ft

2.

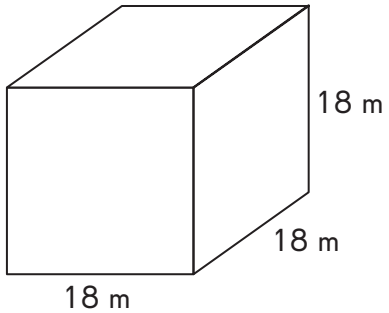


Length = _____ in.

Width = _____ in.

Height = _____ in.

3.



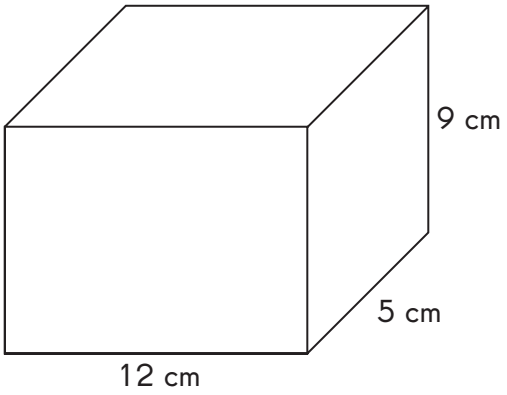
Length = _____ m

Width = _____ m

Height = _____ m

Find the volume of each rectangular prism.

4.



The length of the rectangular prism is _____ centimeters.

The width of the rectangular prism is _____ centimeters.

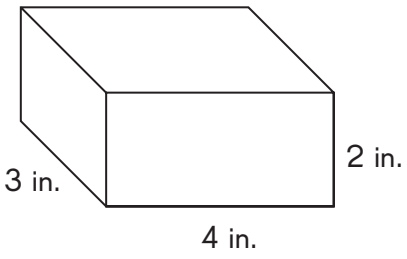
The height of the rectangular prism is _____ centimeters.

Volume of the rectangular prism = length × width × height

= _____ × _____ × _____

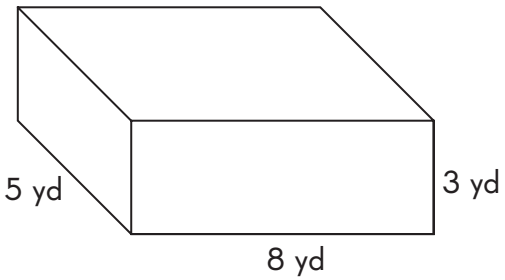
= _____ cm^3

5.



Volume = _____

6.

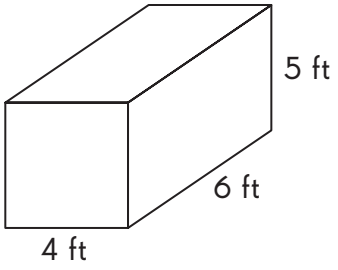


Volume = _____

Name: _____ **Date:** _____

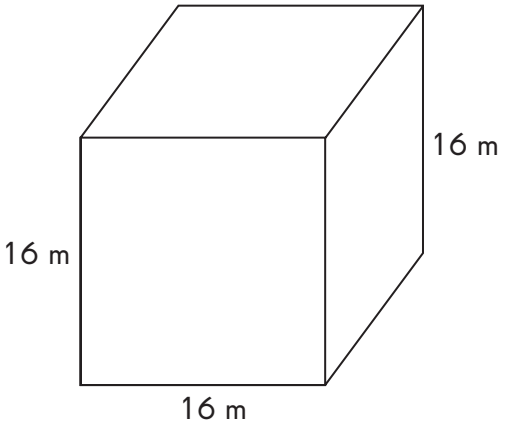
Find the volume of each rectangular prism or cube.

7.



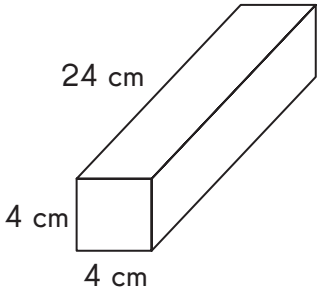
Volume = _____

8.



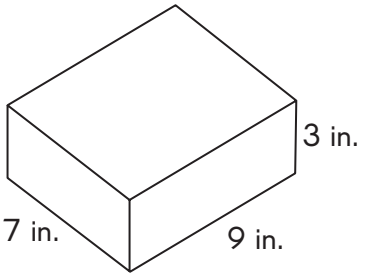
Volume = _____

9.



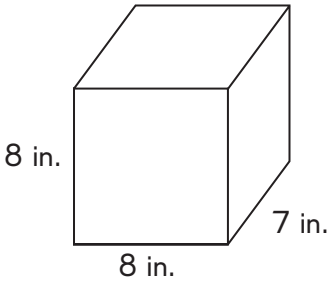
Volume = _____

10.



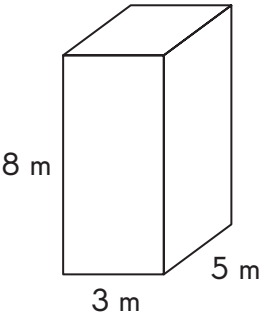
Volume = _____

11.



Volume = _____

12.



Volume = _____

Find the volume of each rectangular prism.

	Length	Width	Height	Volume
13.	5 cm	12 cm	9 cm	
14.	10 in.	25 in.	14 in.	
15.	7 m	12 m	8 m	
16.	24 ft	10 ft	15 ft	

Solve. Show your work.

17. Find the volume of a cube with edges measuring 9 centimeters.

18. A rectangular prism has a length of 8 feet and a height of 5 feet. Its length is twice its width. Find the volume of the rectangular prism.

19. The base of a rectangular prism is a square whose sides each measure 9 inches. The height of the rectangular prism is 11 inches. Find its volume.

Name: _____ Date: _____

Practice 6 Volume of a Rectangular Prism and Liquid

Write each measure in milliliters.

1. 690 cm^3 = _____

2. 207 cm^3 = _____

3. 2,000 cm^3 = _____

4. 4,600 cm^3 = _____

Write each measure in cubic centimeters.

5.	420 mL = _____	**L**
7.	3 L = _____	**T**
9	2 L 125 mL = _____	**E**
11.	10 L 50 mL = _____	**Y**

6.	568 mL = _____	**O**
8.	15 L = _____	**S**
10.	5 L 60 mL = _____	**W**
12.	7 L 2 mL = _____	**N**

Do you know which national park is the oldest in the United States? Match the letters to the answers to find out.

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
10,050	2,125	420	420	568	5,060	15,000	3,000	568	7,002	2,125

National Park

Write each measure in liters and milliliters.

13. 720 cm^3 = _____

14. 7,000 cm^3 = _____

15. 2,050 cm^3 = _____

16. 1,470 cm^3 = _____

17. 9,801 cm^3 = _____

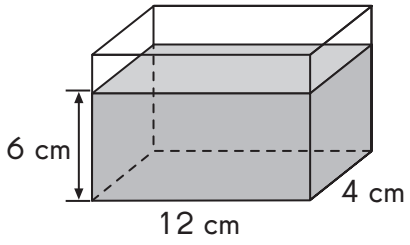
18. 4,003 cm^3 = _____

19. 10,600 cm^3 = _____

20. 1,075 cm^3 = _____

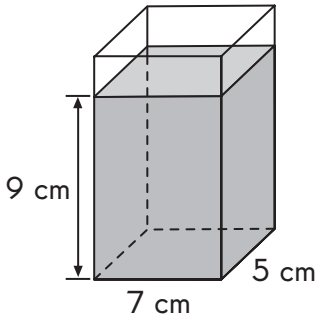
Find the volume of water in each rectangular tank in milliliters. (Hint: 1 cm^3 = 1 mL)

21.



Volume = _____

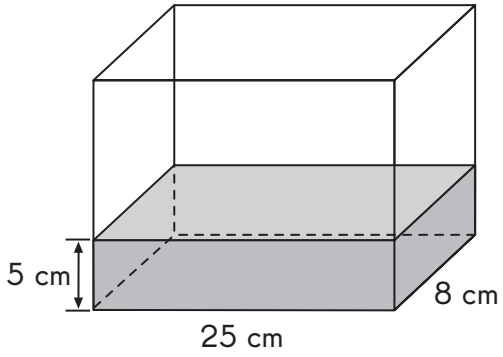
22.



Volume = _____

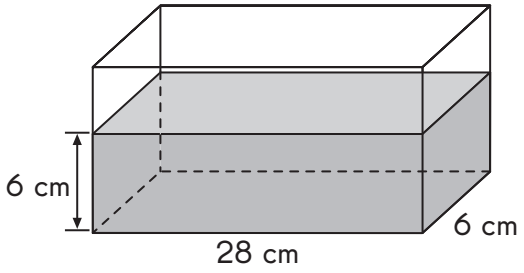
Find the volume of water in each rectangular tank in liters and milliliters. (Hint: 1,000 cm^3 = 1 L)

23.



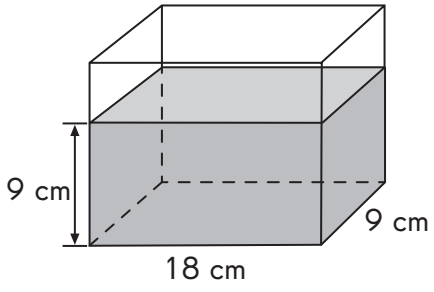
Volume = _____

24.



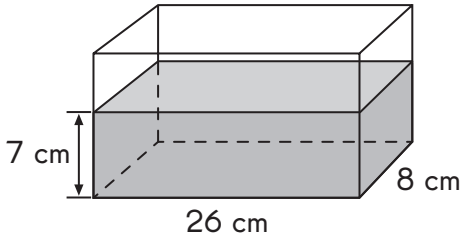
Volume = _____

25.



Volume = _____

26.

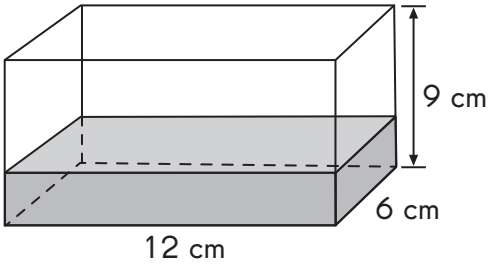


Volume = _____

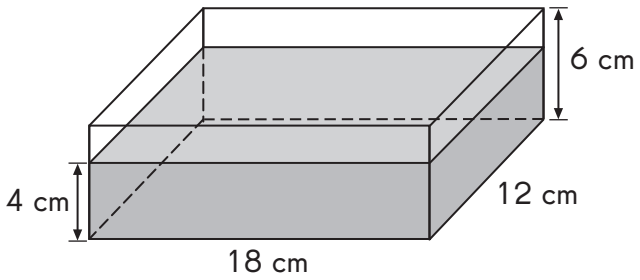
Name: _____ **Date:** _____

Solve. Show your work.

27. How much water is in this tank when it is $\frac{1}{3}$ full?

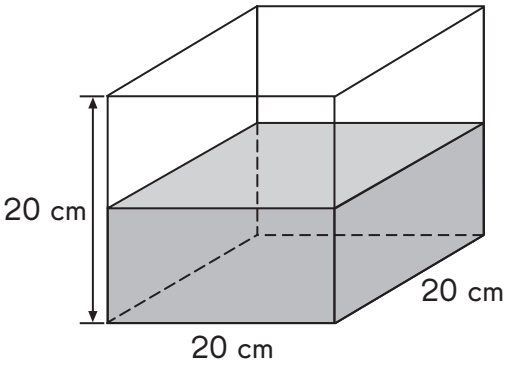


28. This rectangular tank is filled with water to a height of 4 centimeters. How much more water is needed to fill the tank completely?

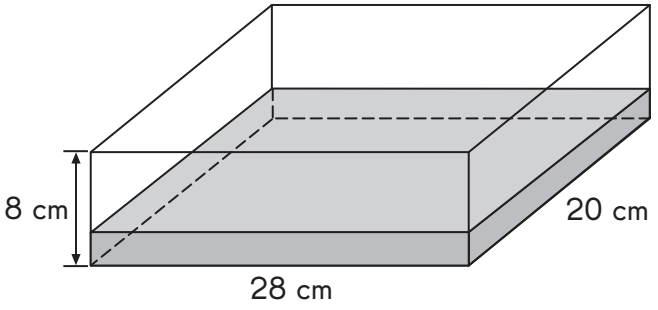


Solve. Show your work.

29. A cubical tank with an edge length of 20 centimeters is filled with 3.75 liters of water. How much more water is needed to fill the tank completely? Give your answer in liters.



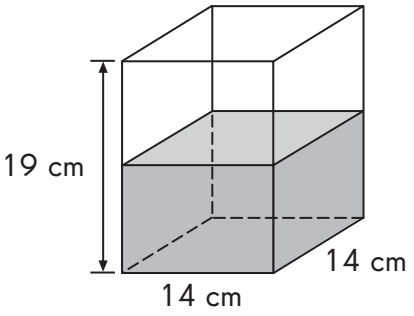
30. The rectangular tank shown is $\frac{1}{4}$-filled with water. Then another 1 liter 400 milliliters of water is added. Find the volume of water in the tank in the end. Give your answer in liters and milliliters.



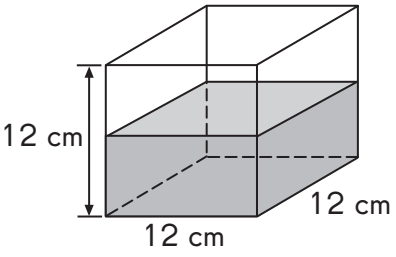
Name: _____ **Date:** _____

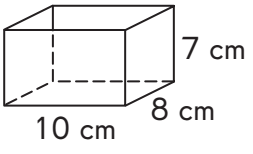
Solve. Show your work.

31. This container is half-filled with oil. What is the volume of oil in the container? Give your answer in liters and milliliters.



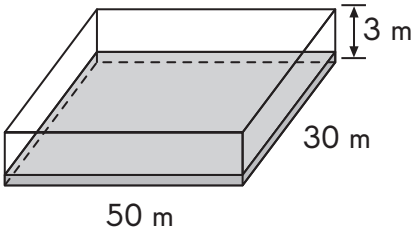
32. A cubical tank whose edges each measure 12 centimeters is half-filled with water. The water is poured into an empty rectangular tank measuring 10 centimeters by 8 centimeters by 7 centimeters until it is full. How much water is left in the cubical tank? Give your answer in milliliters.



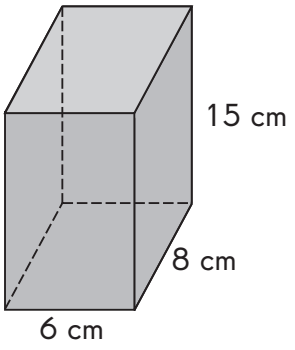


Solve. Show your work.

33. The rectangular swimming pool shown contains 600 cubic meters of water. How much more water has to be added so that the water level is 1 meter from the top?



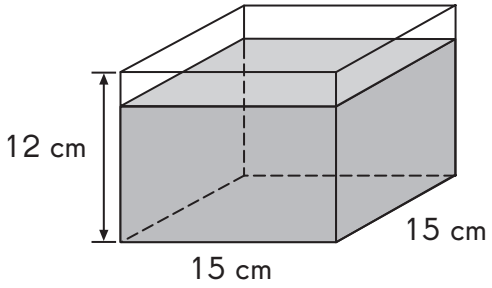
34. The rectangular tank shown is filled completely with water. How much water must be taken out so the height of the water level in the tank is 10 centimeters? Give your answer in milliliters.

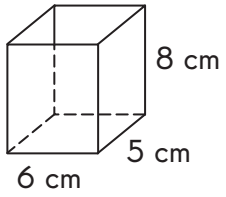


Name: _____ **Date:** _____

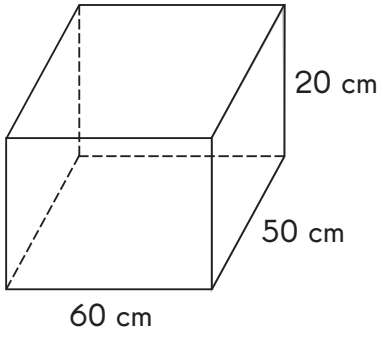
Solve. Show your work.

35. The large rectangular tank shown is $\frac{4}{5}$-filled with water. The water is then poured into the smaller rectangular container until it is full. How much water is left in the tank? Give your answer in liters and milliliters.



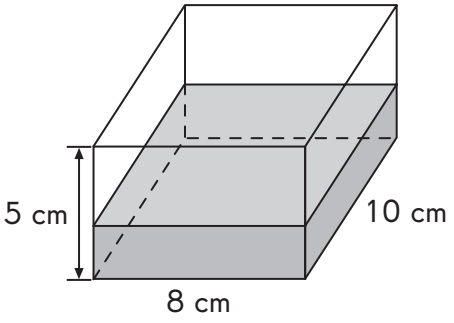


36. Water flows into this tank at 8 liters per minute. How long will it take to fill the tank?



Math Journal

This rectangular container is $\frac{2}{5}$-filled with water. How much more water is needed to increase the height of the water level to 3 centimeters?



Show two methods of solving this problem. Which method do you prefer? Why?

Name: _____ Date: _____

Put On Your Thinking Cap!

Challenging Practice

1. A rectangular tank is half-filled with water. Another 650 cubic centimeters of water are needed to make it $\frac{3}{5}$ full. How much water will be in the tank when it is $\frac{3}{5}$ full?

2. A cube has a surface area of 216 square centimeters. A second cube has edges that are 3 times as long. How much greater is the surface area of the second cube than the first cube?

Put On Your Thinking Cap!

Problem Solving

A prism has a square base whose edges each measure 5 centimeters. The ratio of its height to its width is 4 : 1. Find the volume of the rectangular prism in cubic centimeters.