Name: _____ Date: _____

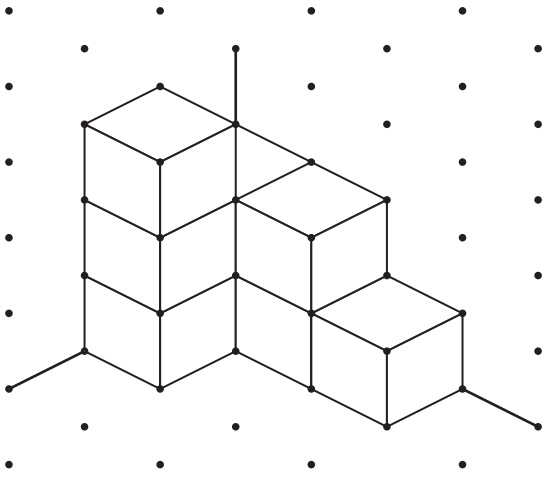
CHAPTER 15

Surface Area and Volume

Lesson 15.1 Building Solids Using Unit Cubes

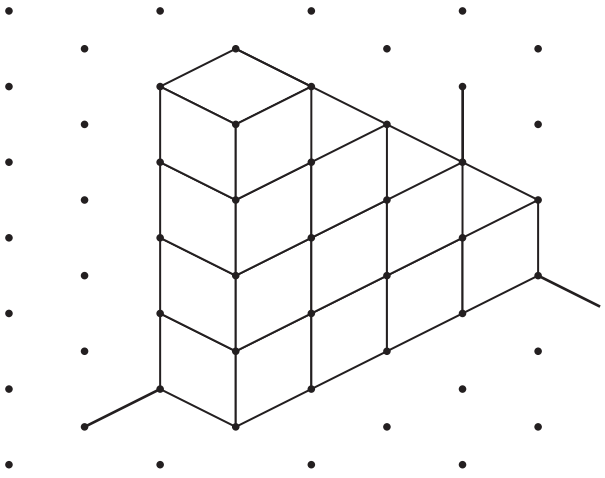
How many unit cubes are used to build each solid?

1.



_____ unit cubes

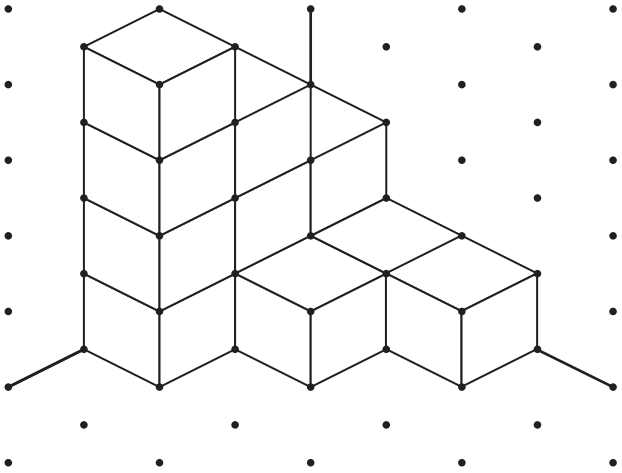
2.



_____ unit cubes

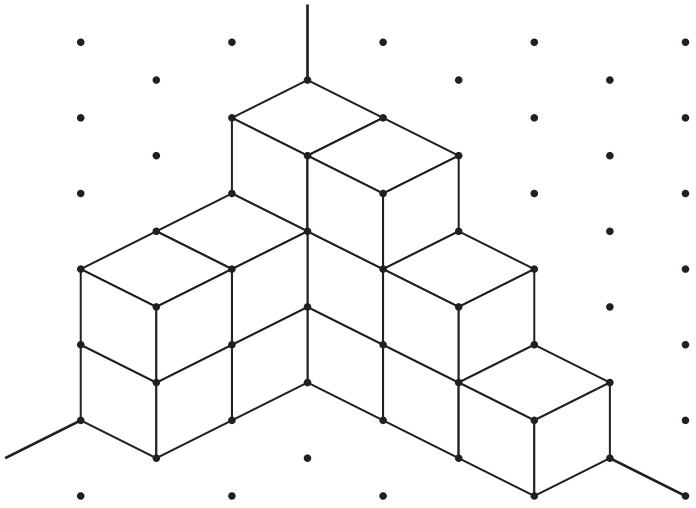
Name: _____ **Date:** _____

3.



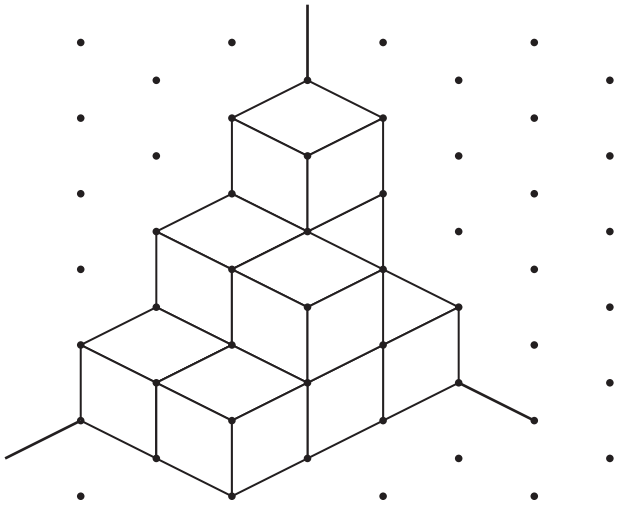
_____ unit cubes

4.



_____ unit cubes

5.



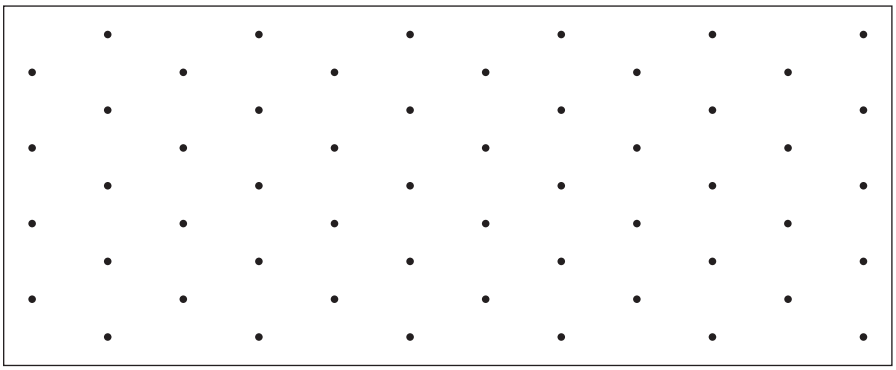
_____ unit cubes

Name: _____ Date: _____

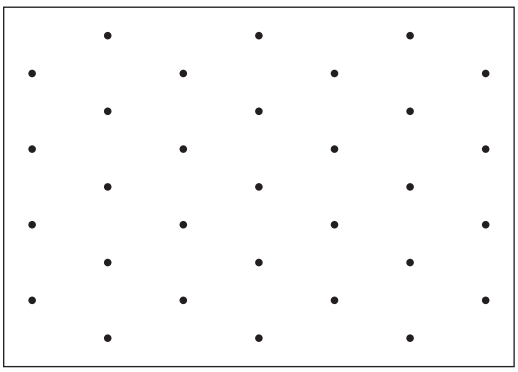
Lesson 15.2 Drawing Cubes and Rectangular Prisms

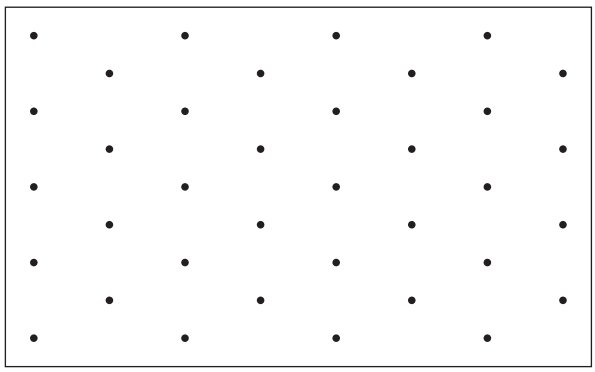
Draw on dot paper.

1. Draw a unit cube.

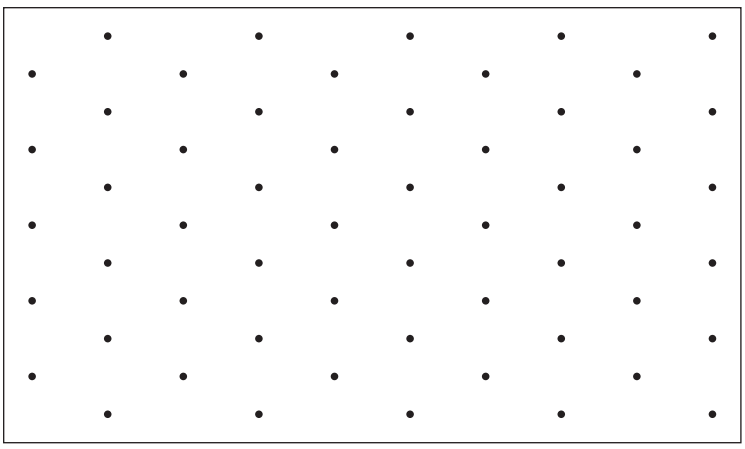


2. Draw two different views of a rectangular prism made up of 2 unit cubes.





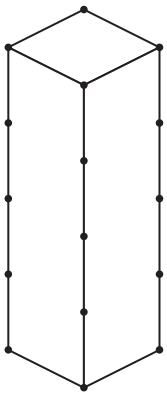
3. Draw a cube made up of 8 unit cubes.



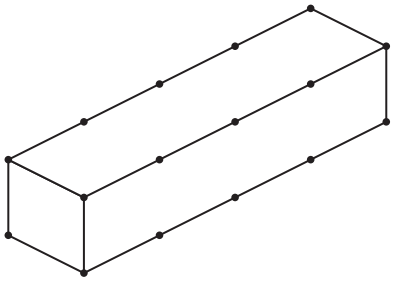
Name: _____ Date: _____

Draw these cubes or rectangular prisms on the dot paper.

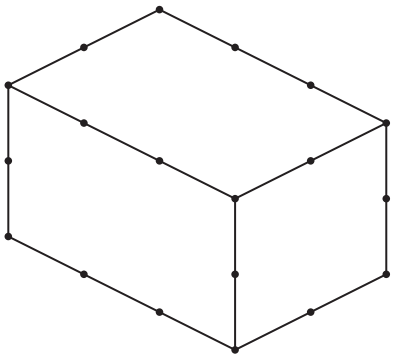
4.



5.

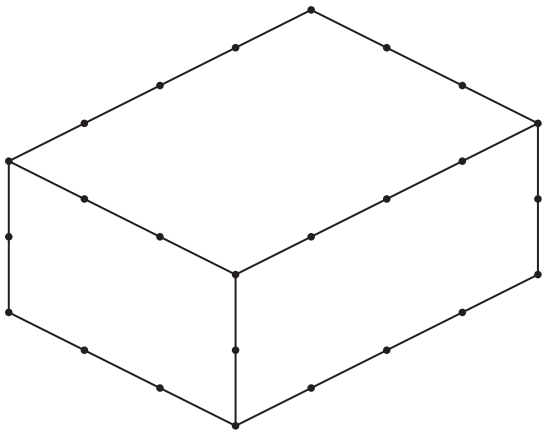


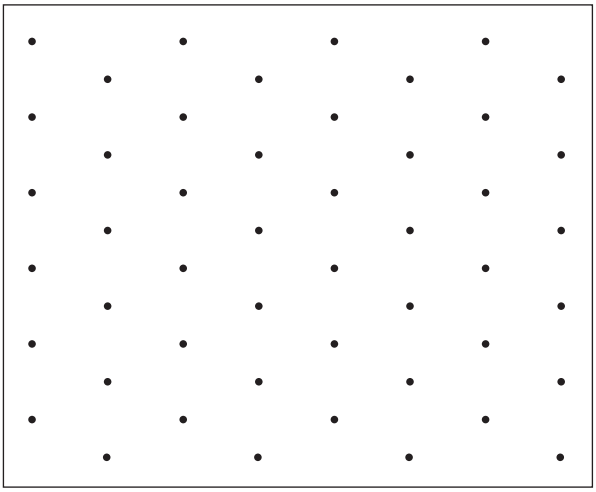
6.



Name: _____ **Date:** _____

7.





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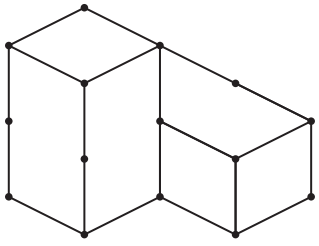
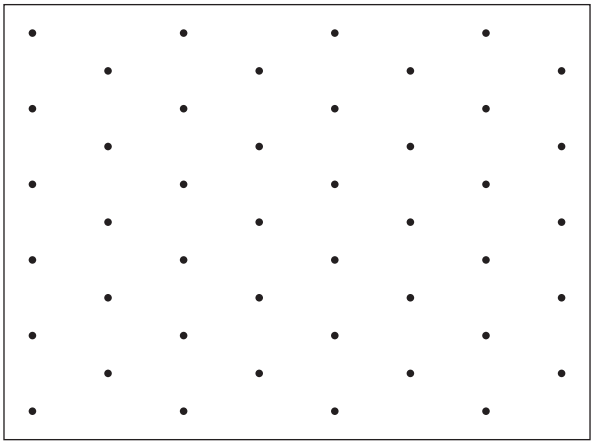
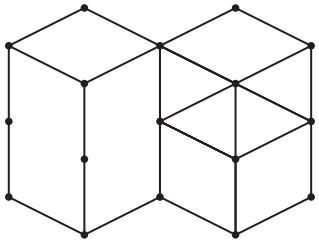
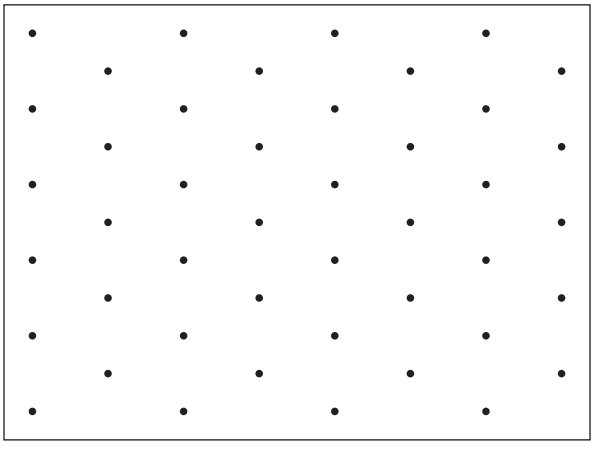




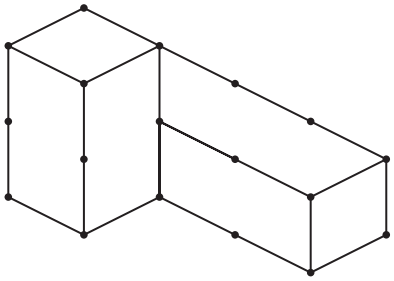
9.

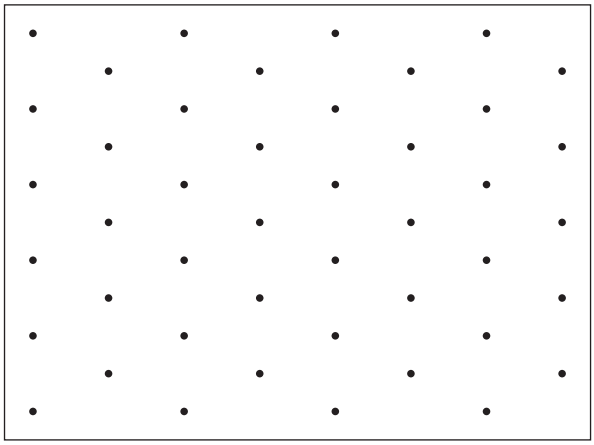




Name: _____ **Date:** _____

10.





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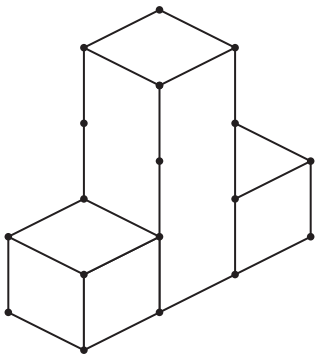
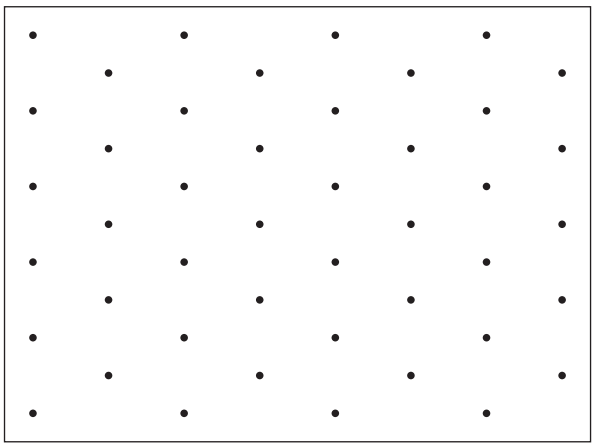
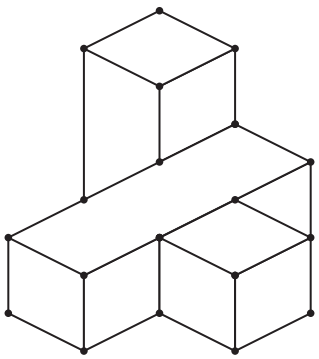
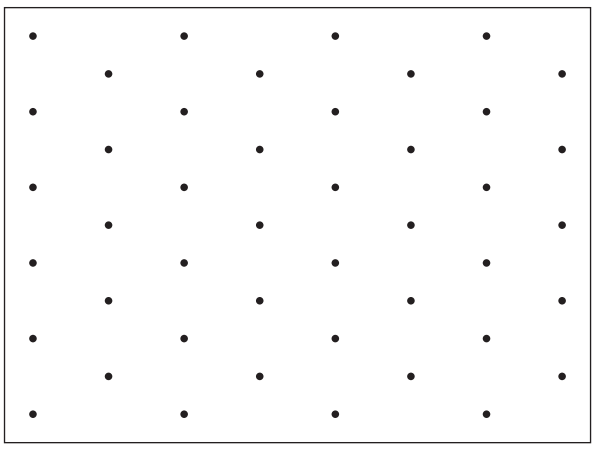




12.

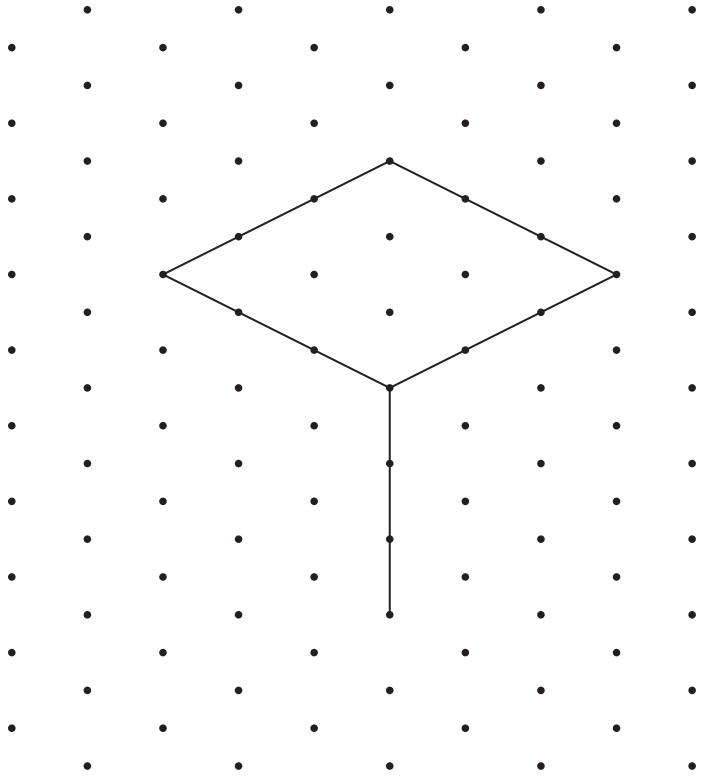




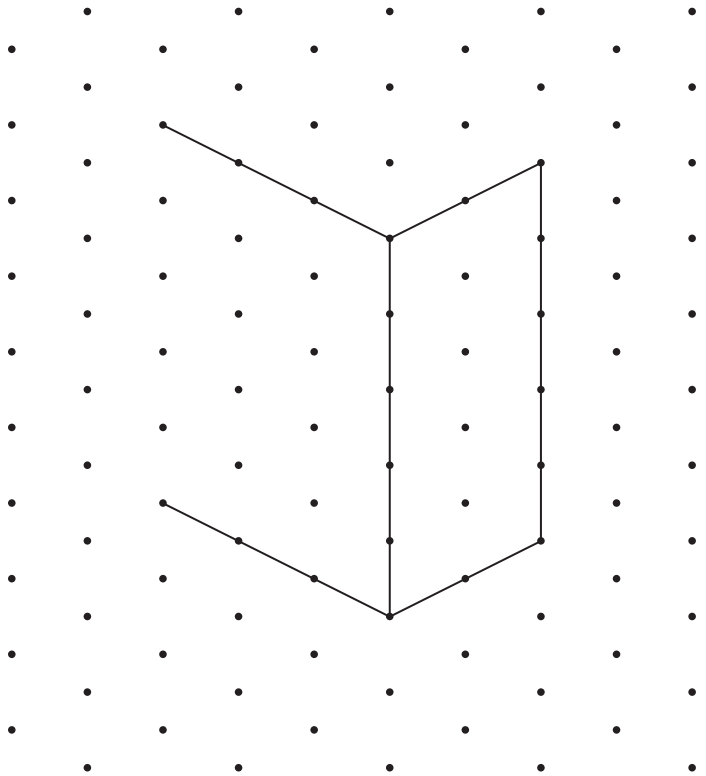
Name: _____ Date: _____

Complete the drawing of each cube or rectangular prism.

13.

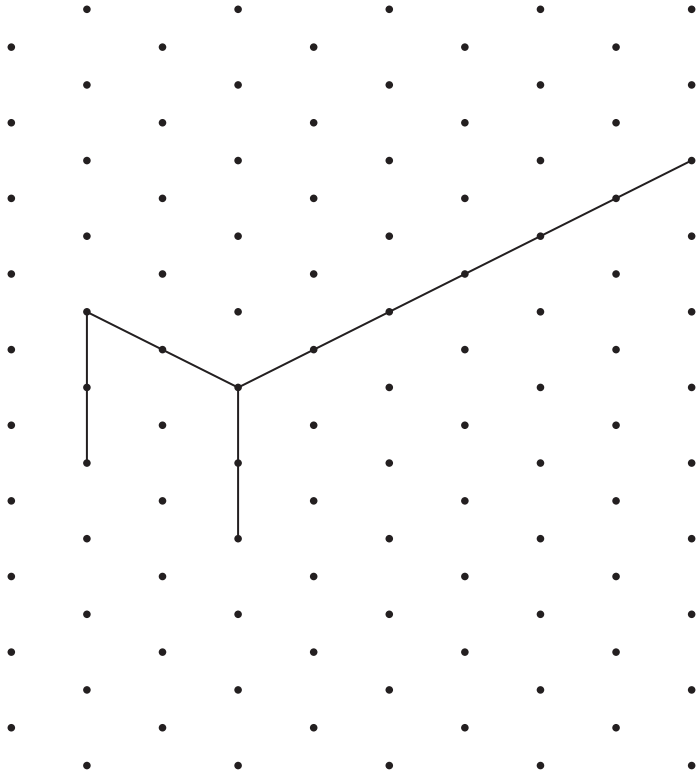


14.

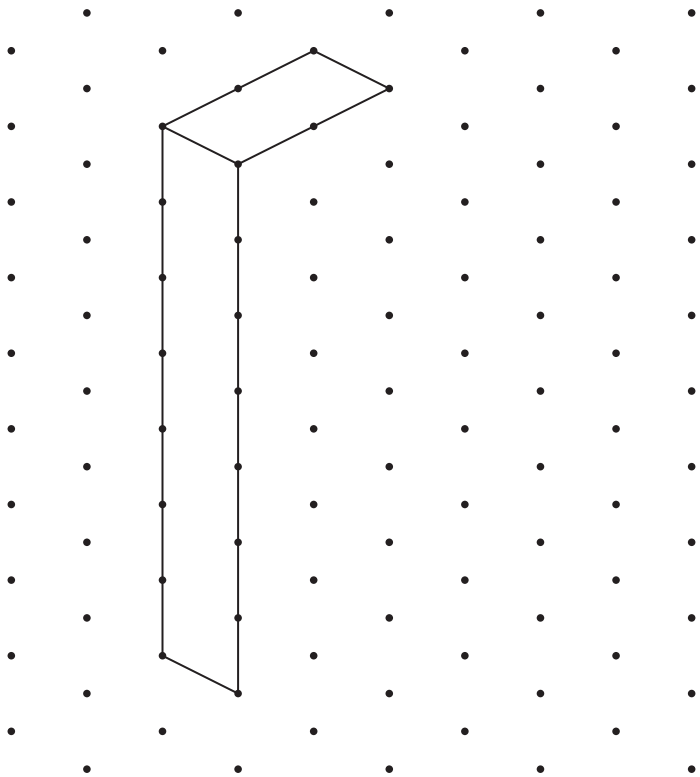


Name: _____ **Date:** _____

15.



16.

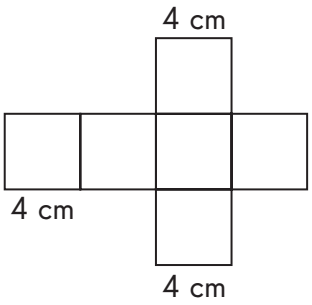


Name: _____ Date: _____

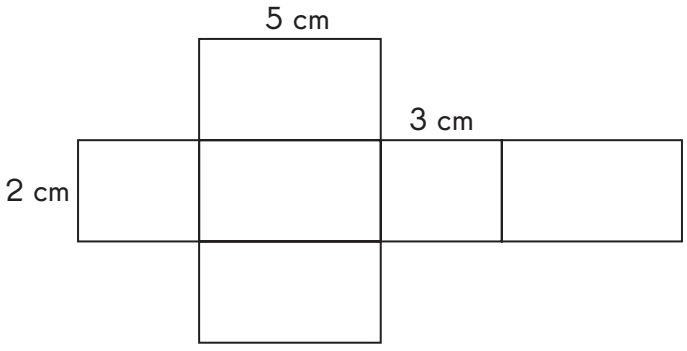
Lesson 15.3 Nets and Surface Area

Find the surface area.

1. The diagram shows the net of a cube.
Find the surface area of the cube.



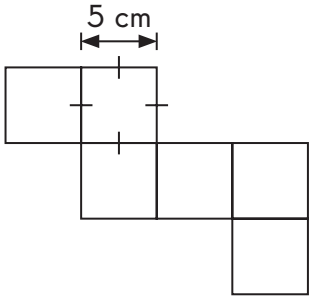
2. The diagram shows the net of a rectangular prism.
Find the surface area of the rectangular prism.



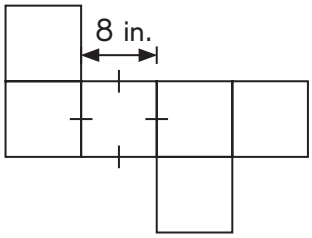
Name: _____ **Date:** _____

The diagrams show the nets of cubes or rectangular prisms.
Find the surface area of each cube or rectangular prism.

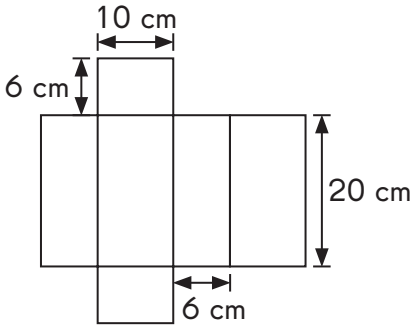
3.



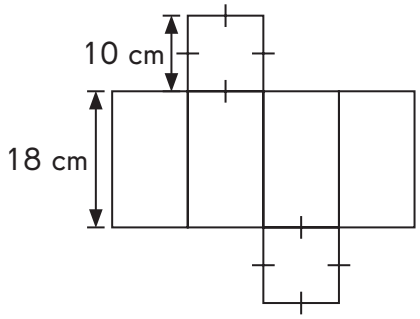
4.



5.



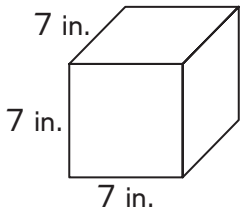
6.



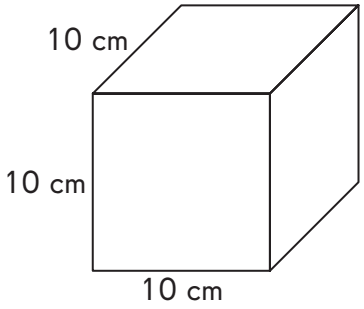
Name: _____ Date: _____

Find the surface area of each cube or rectangular prism.

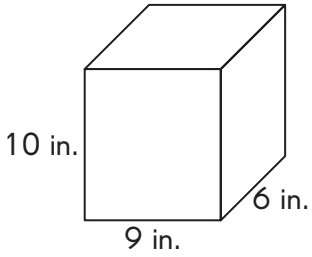
7.



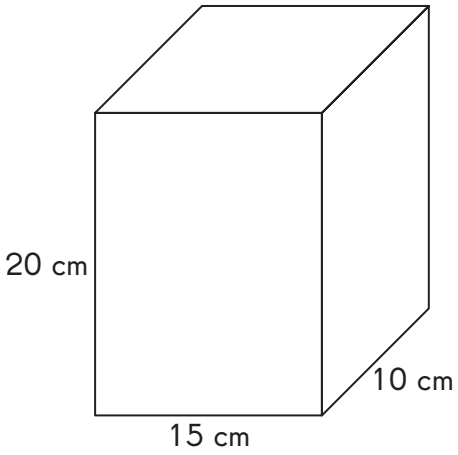
8.



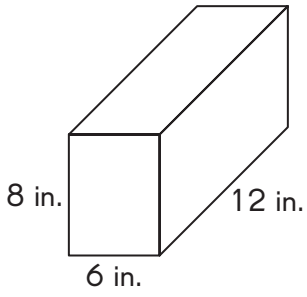
9.



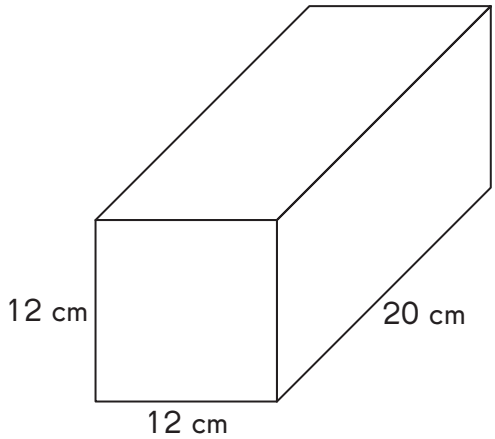
10.



11.



12.



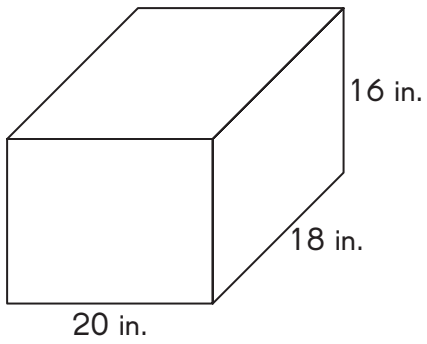
Name: _____ **Date:** _____

Solve. Show your work.

13. The surface area of a cube is 216 square centimeters. Find the length of the cube.

14. A rectangular piece of wood has a length of 30 centimeters and a square base with sides that measure 6 centimeters. What is the surface area of the piece of wood?

15. An open rectangular water tank measures 20 inches by 18 inches by 16 inches. The tank is full of water. Find the total surface area of the tank that is in contact with the water.

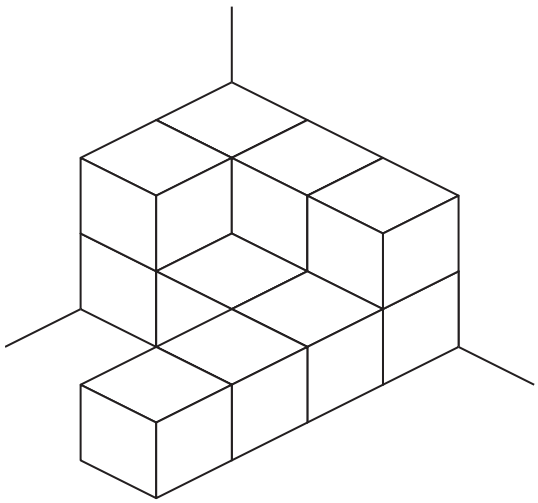


Name: _____ Date: _____

Lesson 15.4 Understanding and Measuring Volume

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

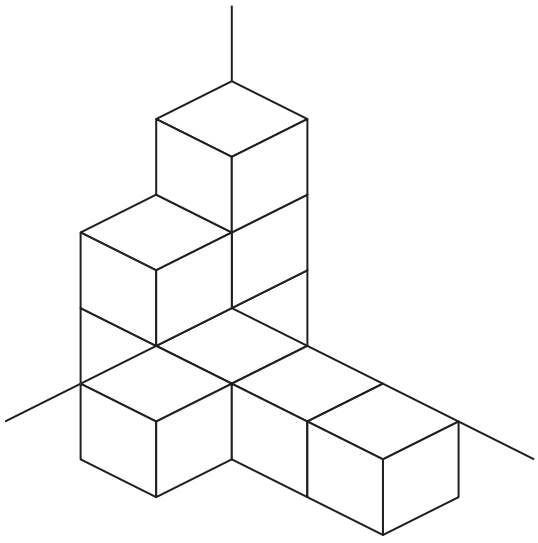
1.



Solid A

Volume = _____ cubic units

2.

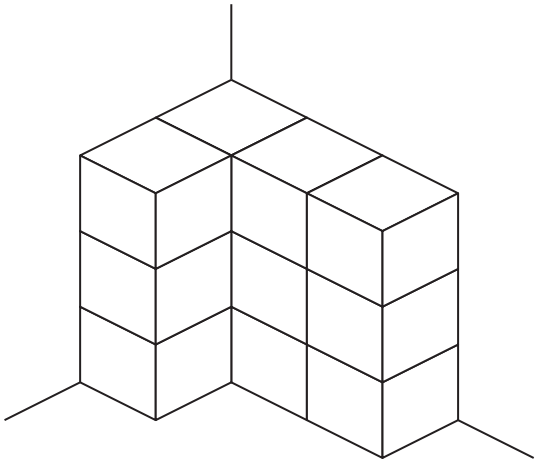


Solid B

Volume = _____ cubic units

Name: _____ **Date:** _____

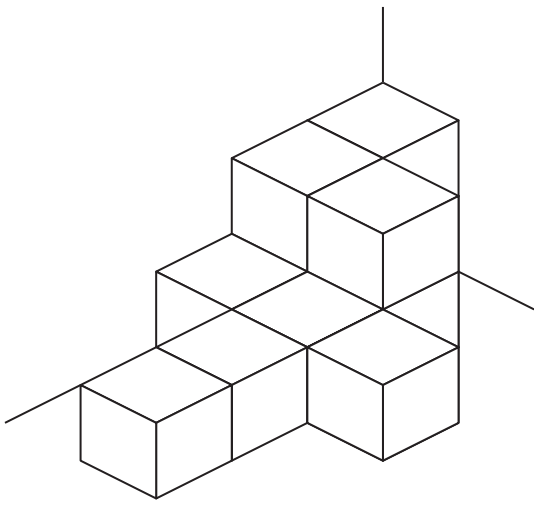
3.



Solid C

Volume = _____ cubic units

4.



Solid D

Volume = _____ cubic units

Compare the volumes of the solids in Exercises 1 to 4. Then fill in the blanks.

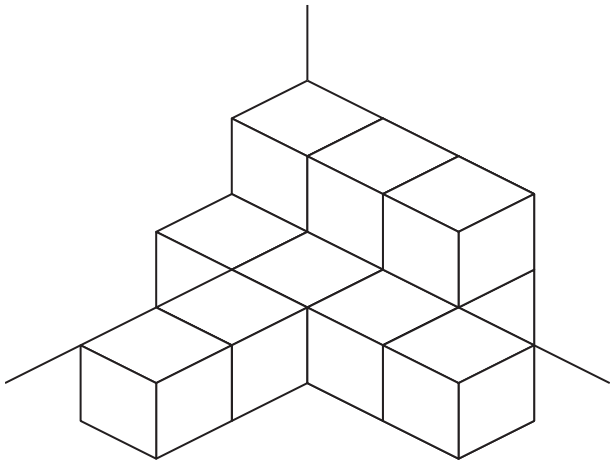
5. Solid _____ has the smallest volume.

6. Solid _____ and Solid _____ have the same volume.

Name: _____ Date: _____

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

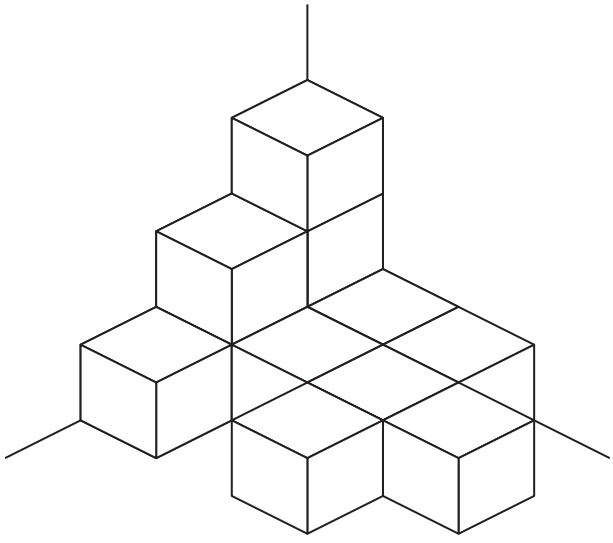
7.



Solid E

Volume = _____ cm^3

8.

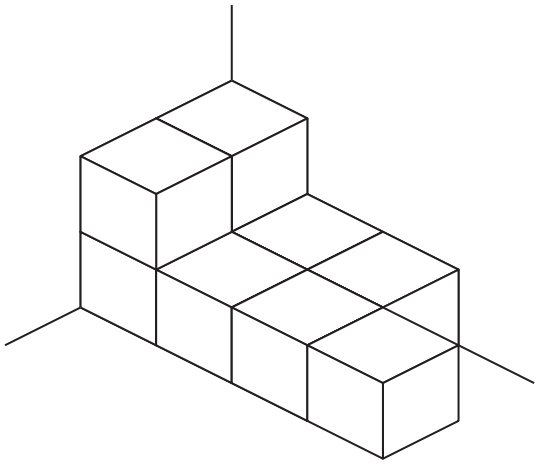


Solid F

Volume = _____ cm^3

Name: _____ **Date:** _____

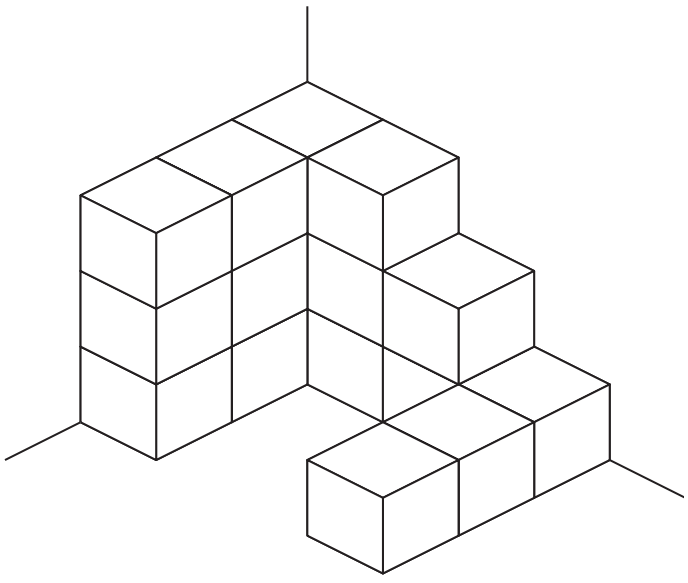
9.



Solid G

Volume = _____ cm^3

10.



Solid H

Volume = _____ cm^3

Name: _____ **Date:** _____

Compare the volumes of the solids in Exercises 7 to 10. Then fill in the blanks.

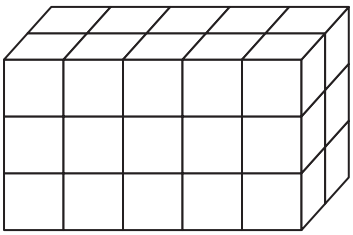
11. Solid _____ has the smallest volume.

12. Solid _____ has the largest volume.

13. Solid _____ and Solid _____ have the same volume.

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

14.



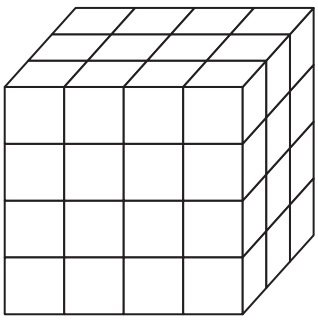
Length = _____ cm

Width = _____ cm

Height = _____ cm

Volume = _____ cm^3

15.



Length = _____ cm

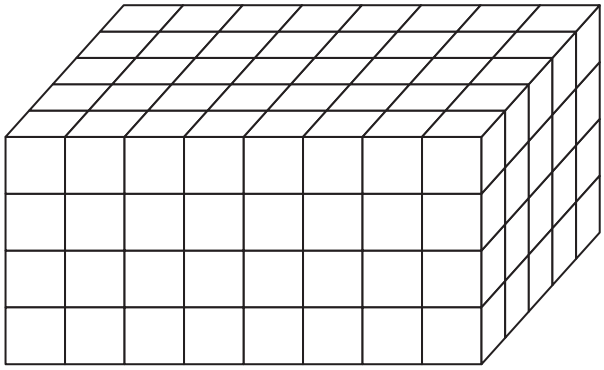
Width = _____ cm

Height = _____ cm

Volume = _____ cm^3

Name: _____ **Date:** _____

16.



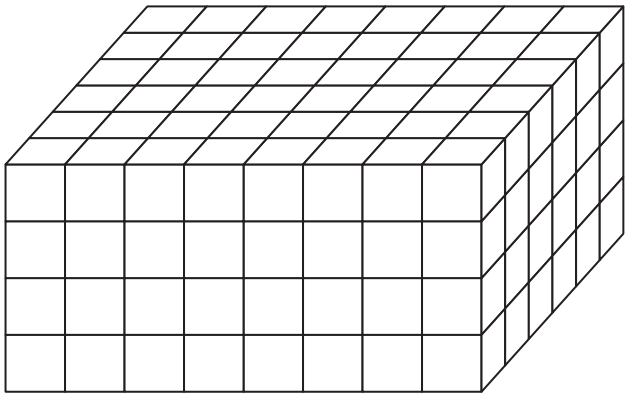
Length = _____ cm

Width = _____ cm

Height = _____ cm

Volume = _____ cm^3

17.



Length = _____ cm

Width = _____ cm

Height = _____ cm

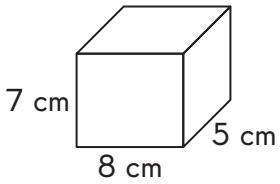
Volume = _____ cm^3

Name: _____ Date: _____

Lesson 15.5 Volume of a Rectangular Prism and Liquid

Find the volume of each rectangular prism.

1.



Length = _____ cm

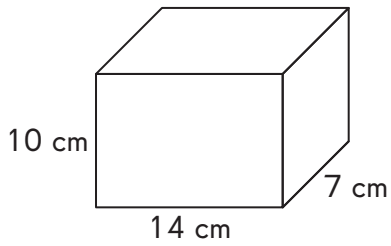
Width = _____ cm

Height = _____ cm

Volume = _____ × _____ × _____

= _____ cm^3

2.



Length = _____ cm

Width = _____ cm

Height = _____ cm

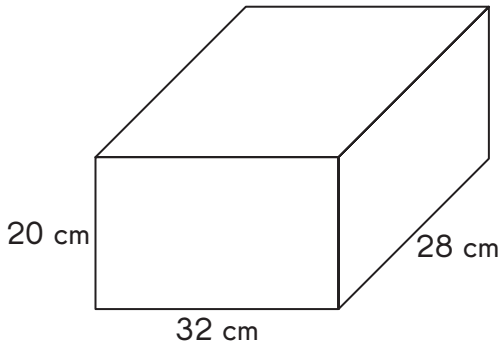
Volume = _____ × _____ × _____

= _____ cm^3

Name: _____ **Date:** _____

Find the volume of each rectangular prism.

3.



Length = _____ cm

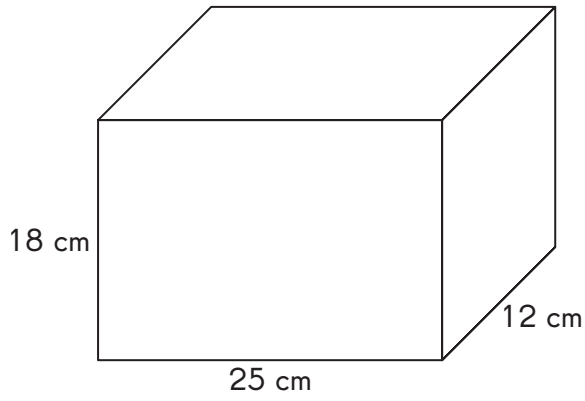
Width = _____ cm

Height = _____ cm

Volume = _____ × _____ × _____

= _____ cm^3

4.

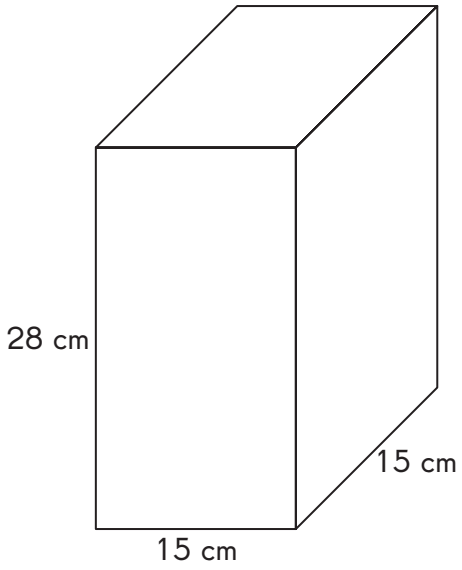


Volume = _____ × _____ × _____

= _____ cm^3

Name: _____ **Date:** _____

5.

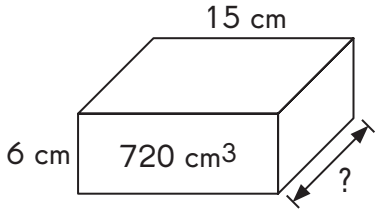


Volume = _____ × _____ × _____

= _____ cm^3

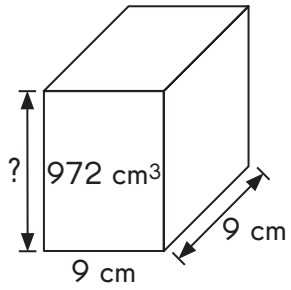
Find the length of the unknown edge of each rectangular prism.

6.



Width = _____ cm

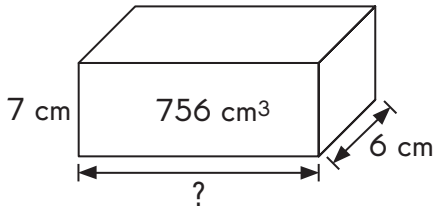
7.



Height = _____ cm

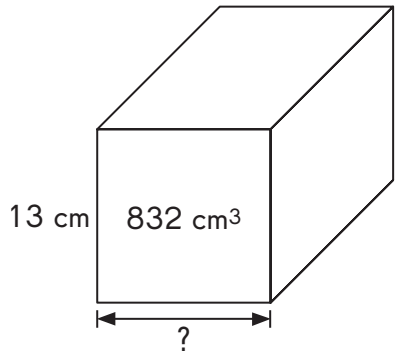
Name: _____ **Date:** _____

8.



Length = _____ cm

9. The figure is a rectangular prism with a square base.



Length = _____ cm

Write each measure in cubic centimeters.

10. 390 mL = _____ cm^3

11. 1 L 125 mL = _____ cm^3

12. 2 L 600 mL = _____ cm^3

13. 4 L 80 mL = _____ cm^3

14. 5 L 50 mL = _____ cm^3

15. 2 L 6 mL = _____ cm^3

Write each measure in liters and milliliters or liters.

16. 890 cm^3 = _____ L _____ mL

17. 1,850 cm^3 = _____ L _____ mL

18. 3,065 cm^3 = _____ L _____ mL

19. 530 cm^3 = _____ L

20. 755 cm^3 = _____ L

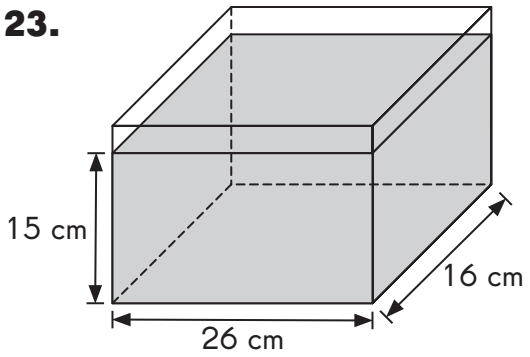
21. 1,650 cm^3 = _____ L

22. 2,075 cm^3 = _____ L

Name: _____ Date: _____

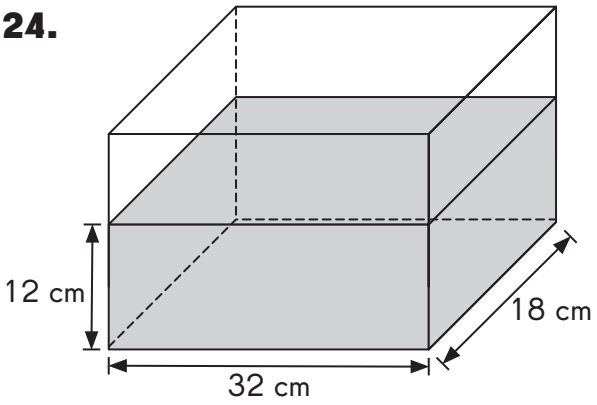
Find the volume of water in each rectangular tank in milliliters.
Hint: 1 cm^3 = 1 mL

23.



Volume = _____

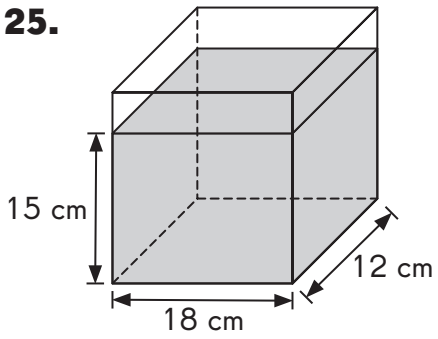
24.



Volume = _____

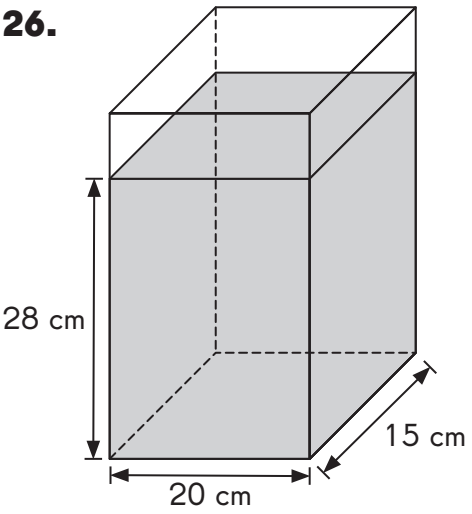
Find the volume of water in each rectangular tank in liters.
Hint: 1 cm^3 = 1 mL
1,000 cm^3 = 1 L

25.



Volume = _____

26.

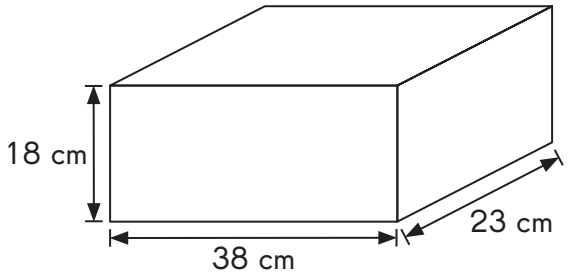


Volume = _____

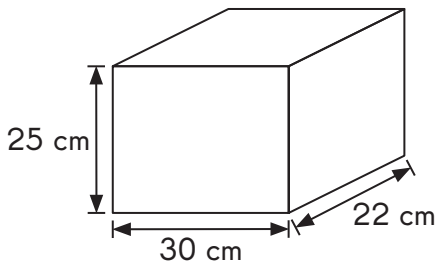
Name: _____ Date: _____

Solve. Show your work.

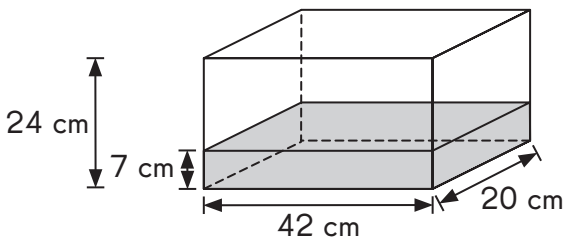
27. A rectangular fish tank measures 38 centimeters by 23 centimeters by 18 centimeters. How much water is in the tank when it is $\frac{2}{3}$-full? Give your answer in liters and milliliters.



28. A rectangular tank measuring 30 centimeters long, 22 centimeters wide, and 25 centimeters high is $\frac{4}{5}$-full of water. If $\frac{1}{4}$ of the water is removed, what is the volume of water left in the tank? Give your answer in liters.



29. A rectangular tank measuring 42 centimeters by 20 centimeters by 24 centimeters is filled with water to a height of 7 centimeters. What is the volume of water needed to fill the tank completely? Give your answer in liters.

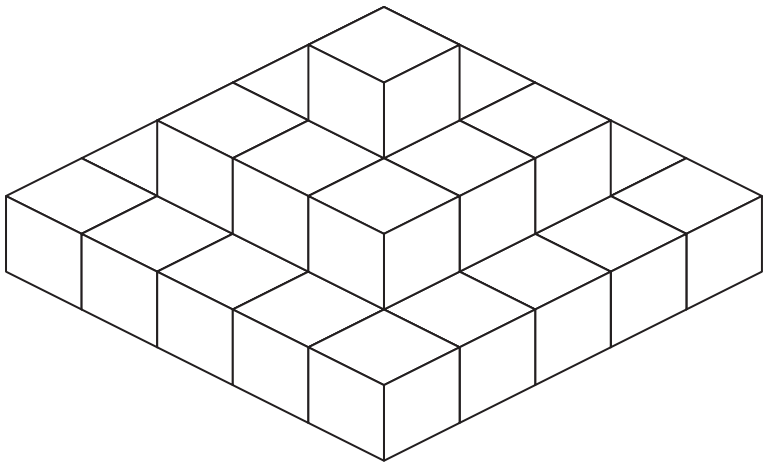


Name: _____ Date: _____

Put on Your Thinking Cap!

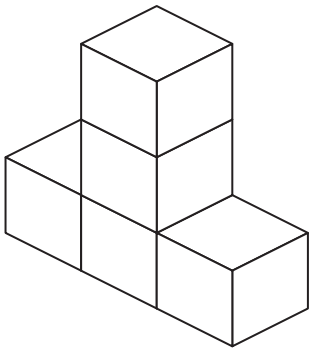
Solve. Show your work.

1. Jessica used 35 unit cubes to build the solid shown. Another row of cubes is to be placed below the bottom row following the same pattern. How many more cubes will Jessica need?

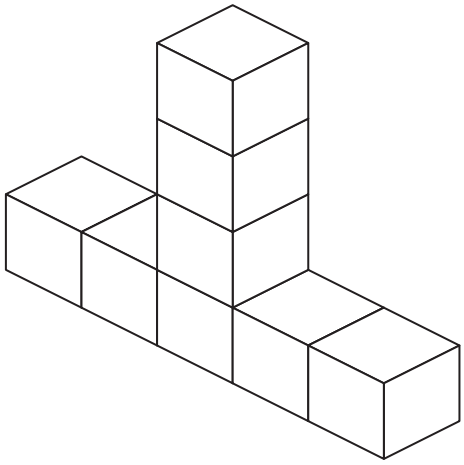


Name: _____ **Date:** _____

2. Paul uses 5 unit cubes to build the first figure and 8 unit cubes to build the second figure into the T-shaped patterns shown.



Pattern 1



Pattern 2

a. Paul continues to build the third and fourth patterns. Find the number of unit cubes in Patterns 3 and 4. Record your answers in the table.

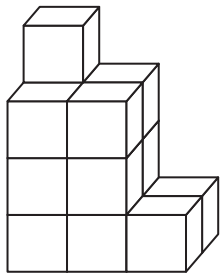
T-Shaped Pattern	1	2	3	4
Number of Unit Cubes	5	$5 + 3 = 8$		

b. How many cubes would be used to build Patterns 5 and 6?

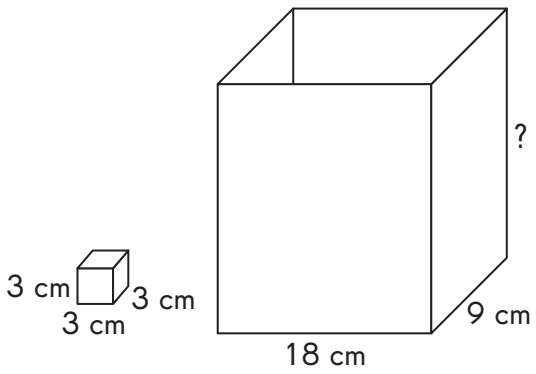
c. Find the number of unit cubes in Pattern 10.

Name: _____ **Date:** _____

3. The solid is made up of identical cubes glued together. The surface area of the solid is painted blue. The volume of the solid is 960 cubic centimeters. Find the surface area that is painted blue.



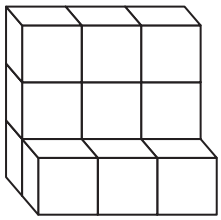
4. In order to fill the box completely, 126 3-centimeter cubes are needed. What is the height of the box?



Name: _____ **Date:** _____

5. The solid is made up of 3-centimeter cubes.

a. Find the volume of the solid.



b. Find the surface area of the solid.

c. The whole solid is painted red.

i. Find the number of cubes that have only two faces painted red.

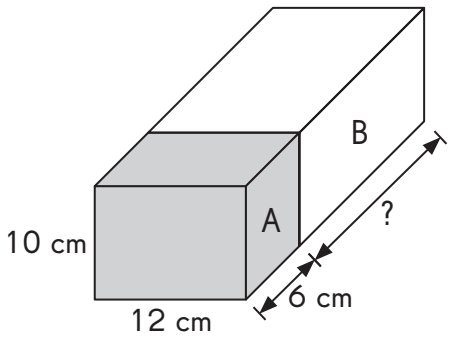
ii. Find the number of cubes that have only three faces painted red.

iii. Find the number of cubes that have only four faces painted red.

Name: _____ **Date:** _____

6. Two wooden blocks, A and B, are glued together. The ratio of the volume of block A to the volume of block B is 3 : 7.

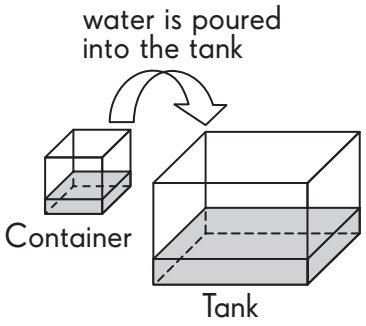
a. What is the volume of block B?



b. What is the width of block B?

Name: _____ **Date:** _____

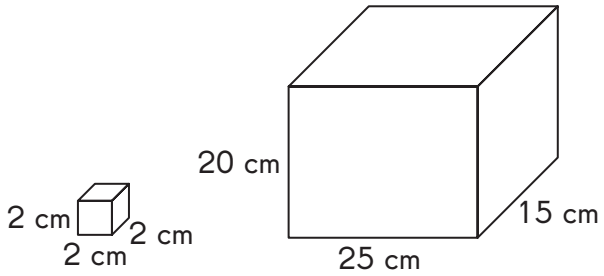
7. A cubic container was completely filled with water. When $\frac{3}{4}$ of the water from the container was poured into a rectangular tank, the tank became $\frac{1}{4}$ full. The capacity of the tank is 1.024 liters more than that of the cubic container. Find the length of the cubic container.



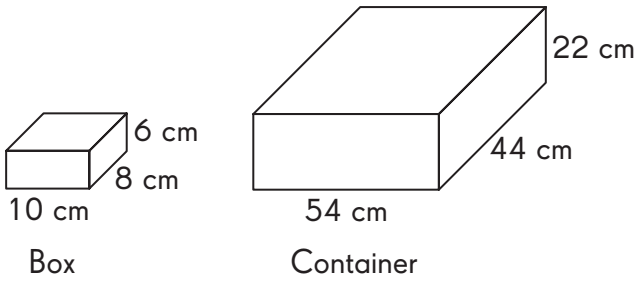
8. John wanted to build a model wall measuring 36 centimeters long, 8 centimeters wide, and 21 centimeters high. He used blocks that measured 3 centimeters by 4 centimeters by 2 centimeters. John stopped after building $\frac{5}{9}$ of the wall. How many more blocks will John need to complete the wall?

Name: _____ **Date:** _____

9. How many 2-centimeter cubes can be packed into a rectangular prism measuring 25 centimeters by 15 centimeters by 20 centimeters?



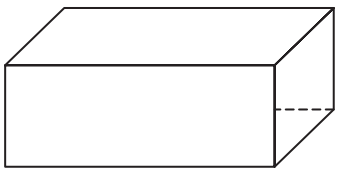
10. Identical watch boxes each measuring 10 centimeters by 8 centimeters by 6 centimeters are packed in a rectangular container measuring 54 centimeters by 44 centimeters by 22 centimeters. What is the maximum number of watch boxes that can be packed into the container?



Name: _____ **Date:** _____

11. Two identical rectangular cards measuring 20 centimeters by 12 centimeters are folded to form two different rectangular solids.

a. One of the solids is shown below. Label its width and height.



b. Draw the other rectangular solid. Label its length, width, and height.

c. Find the volume of each rectangular solid.