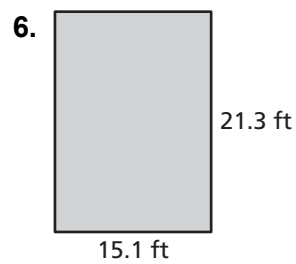
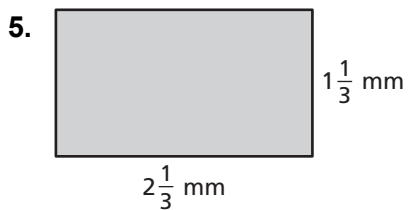
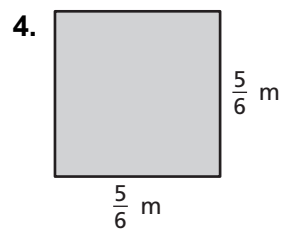
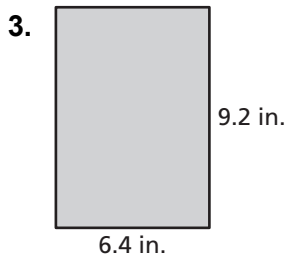
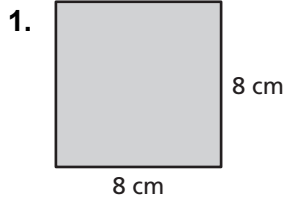


**Chapter
9**

Fair Game Review

Find the area of the square or rectangle.



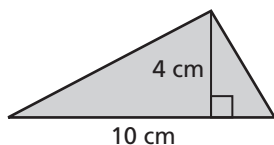
7. An artist buys a square canvas with a side length of 2.5 feet. What is the area of the canvas?

Chapter
9

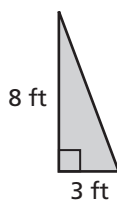
Fair Game Review (continued)

Find the area of the triangle.

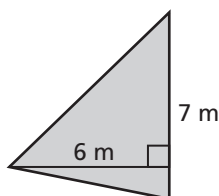
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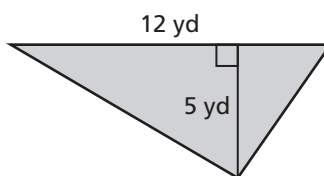
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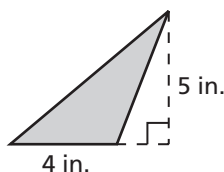
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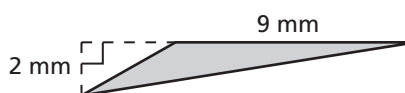
11.



12.



13.



14. A spirit banner for a pep rally has the shape of a triangle. The base of the banner is 8 feet and the height is 6 feet. Find the area of the banner.

9.1

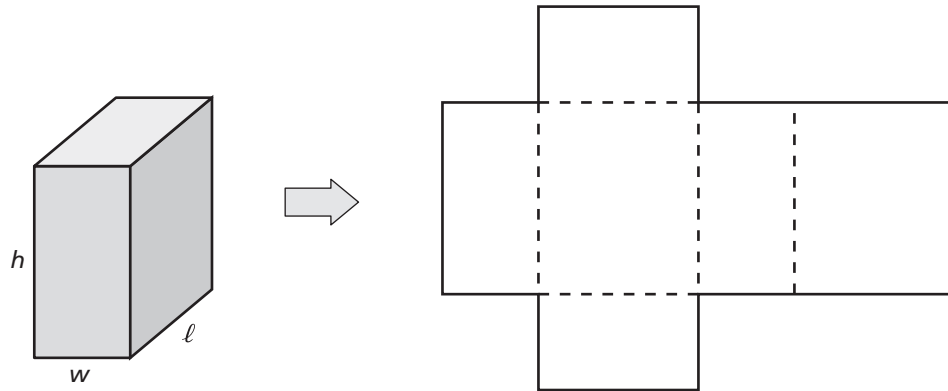
Surface Areas of Prisms

For use with Activity 9.1

Essential Question How can you find the surface area of a prism?

1 ACTIVITY: Surface Area of a Rectangular Prism

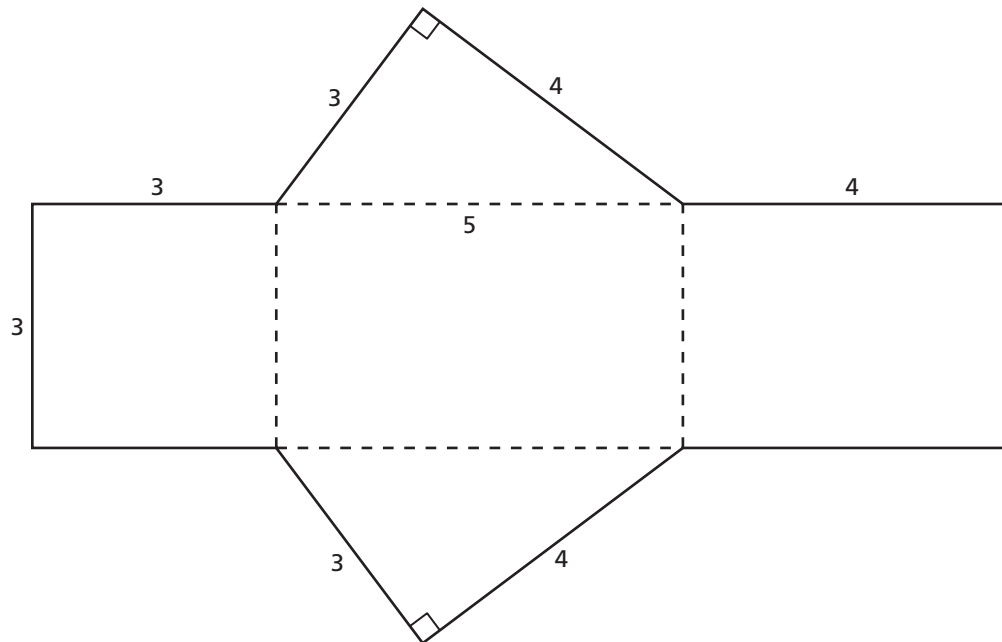
Work with a partner. Use the net for a rectangular prism. Label each side as h , w , or ℓ . Then write a formula for the surface area of a rectangular prism.



2 ACTIVITY: Surface Area of a Triangular Prism

Work with a partner.

- a. Find the surface area of the solid shown by the net. Use a cut-out of the net.* Fold it to form a solid. Identify the solid.



- b. Which of the surfaces of the solid are bases? Why?

*Cut-outs are available in the back of the Record and Practice Journal.

9.1 Surface Areas of Prisms (continued)**3 ACTIVITY:** Forming Rectangular Prisms

Work with a partner.

- Use 24 one-inch cubes to form a rectangular prism that has the given dimensions.
- Draw each prism.
- Find the surface area of each prism.

a. $4 \times 3 \times 2$

b. $1 \times 1 \times 24$

c. $1 \times 2 \times 12$

d. $1 \times 3 \times 8$

e. $1 \times 4 \times 6$

f. $2 \times 2 \times 6$

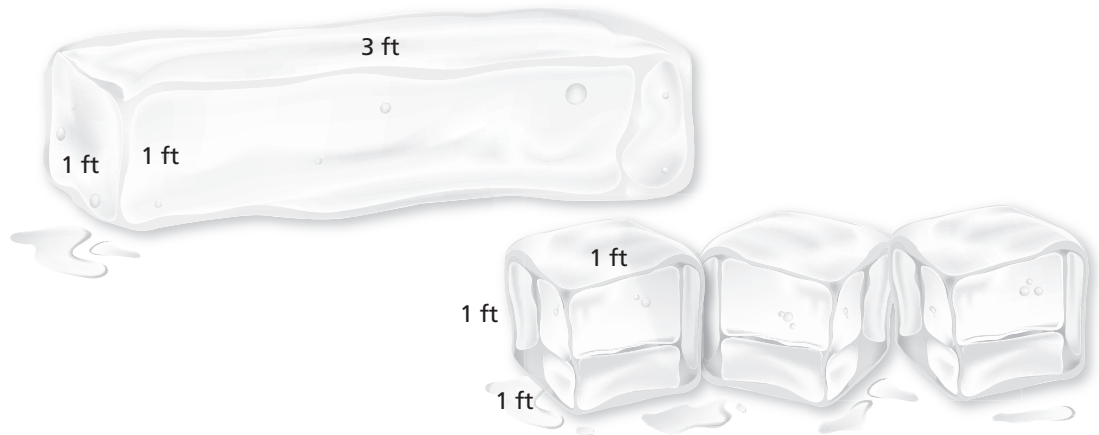
g. $2 \times 4 \times 3$

9.1 Surface Areas of Prisms (continued)**What Is Your Answer?**

4. Use your formula from Activity 1 to verify your results in Activity 3.

5. **IN YOUR OWN WORDS** How can you find the surface area of a prism?

6. **REASONING** When comparing ice blocks with the same volume, the ice with the greater surface area will melt faster. Which will melt faster, the bigger block or the three smaller blocks? Explain your reasoning.



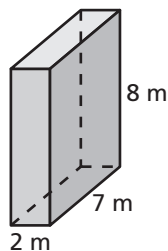
9.1

Practice

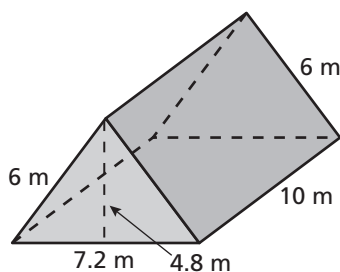
For use after Lesson 9.1

Find the surface area of the prism.

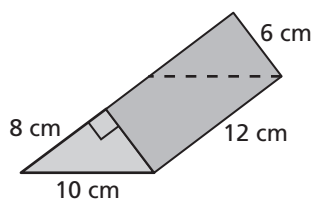
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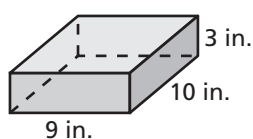
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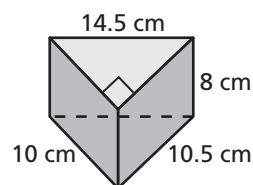
3.



4.



5. You buy a ring box as a birthday gift that is in the shape of a triangular prism. What is the least amount of wrapping paper needed to wrap the box?

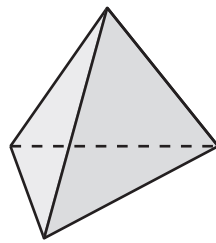
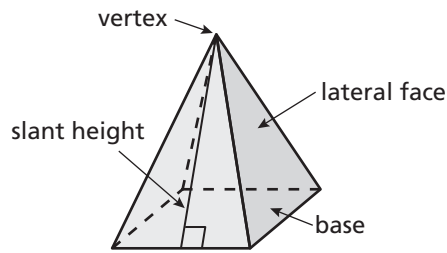
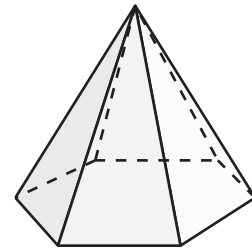


9.2**Surface Areas of Pyramids**

For use with Activity 9.2

Essential Question How can you find the surface area of a pyramid?

Even though many well-known pyramids have square bases, the base of a pyramid can be any polygon.

**Triangular Base****Square Base****Hexagonal Base****1 ACTIVITY:** Making a Scale Model

Work with a partner. Each pyramid has a square base.

- Draw a net for a scale model of one of the pyramids. Describe your scale.
 - Cut out the net and fold it to form a pyramid.
 - Find the lateral surface area of the real-life pyramid.
- a. Cheops Pyramid in Egypt
Side = 230 m, Slant height \approx 186 m
- b. Muttart Conservatory in Edmonton
Side = 26 m, Slant height \approx 27 m



- c. Louvre Pyramid in Paris
Side = 35 m, Slant height \approx 28 m

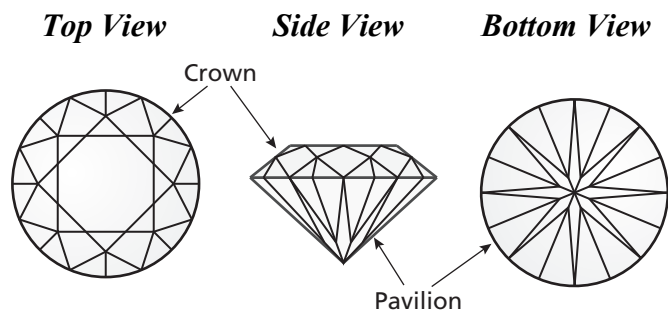


- d. Pyramid of Caius Cestius in Rome
Side = 22 m, Slant height \approx 29 m

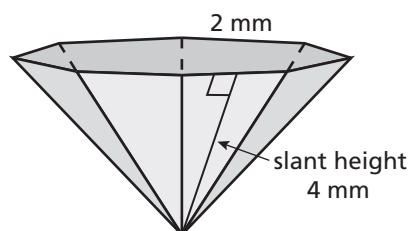


9.2 Surface Areas of Pyramids (continued)**2 ACTIVITY:** Estimation

Work with a partner. There are many different types of gemstone cuts. Here is one called a brilliant cut.



The size and shape of the pavilion can be approximated by an octagonal pyramid.

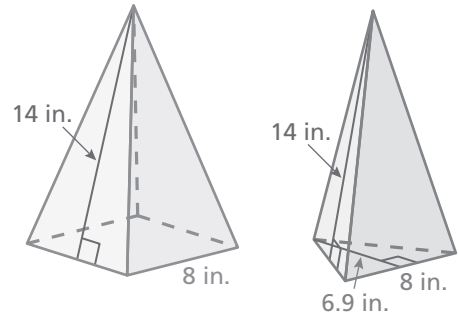


- What does *octagonal* mean?
- Draw a net for the pyramid.
- Find the lateral surface area of the pyramid.

9.2 Surface Areas of Pyramids (continued)**3 ACTIVITY:** Comparing Surface Areas

Work with a partner. Both pyramids have the same side lengths of the base and the same slant heights.

- a. **REASONING** Without calculating, which pyramid has the greater surface area? Explain.



- b. Verify your answer to part (a) by finding the surface area of each pyramid.

What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you find the surface area of a pyramid?
Draw a diagram with your explanation.

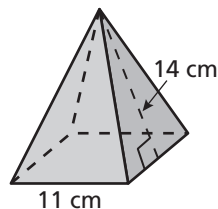
9.2

Practice

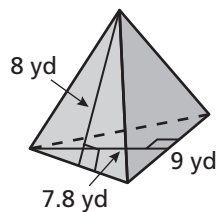
For use after Lesson 9.2

Find the surface area of the regular pyramid.

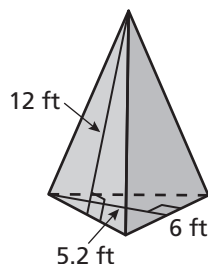
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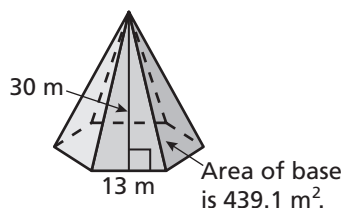
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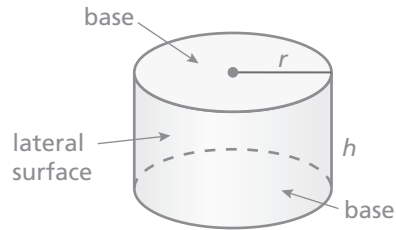
5. The surface area of a triangular pyramid is 305 square inches. The area of the base is 35 square inches. Each face has a base of 9 inches. What is the slant height?

9.3**Surface Areas of Cylinders**

For use with Activity 9.3

Essential Question How can you find the surface area of a cylinder?

A *cylinder* is a solid that has two parallel, identical circular bases.

**1 ACTIVITY: Finding Area**

Work with a partner. Use a cardboard cylinder.

- Talk about how you can find the area of the outside of the roll.
- Estimate the area using the methods you discussed.
- Use the roll and the scissors to find the actual area of the cardboard.
- Compare the actual area to your estimates.

**2 ACTIVITY: Finding Surface Area**

Work with a partner.



- Make a net for the can. Name the shapes in the net.

9.3 Surface Areas of Cylinders (continued)

- Find the surface area of the can
- How are the dimensions of the rectangle related to the dimensions of the can?

3 **ACTIVITY:** Estimation

Work with a partner. From memory, estimate the dimensions of the real-life item in inches. Then use the dimensions to estimate the surface area of the item in square inches.

a.



b.



9.3 Surface Areas of Cylinders (continued)

c.



d.



What Is Your Answer?

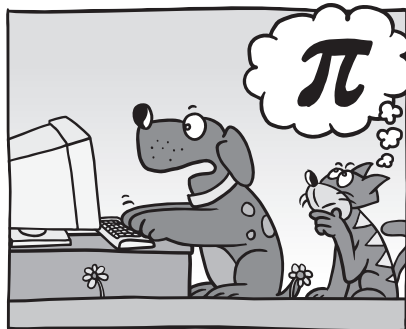
4. **IN YOUR OWN WORDS** How can you find the surface area of a cylinder?
Give an example with your description. Include a drawing of the cylinder.

5. To eight decimal places, $\pi \approx 3.14159265$. Which of the following is closest to π ?

a. 3.14

b. $\frac{22}{7}$

c. $\frac{355}{113}$



"To approximate $\pi \approx 3.141593$,
I simply remember 1, 1, 3, 3, 5, 5."



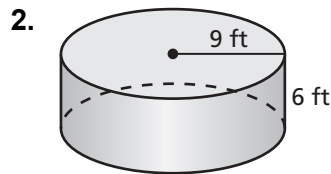
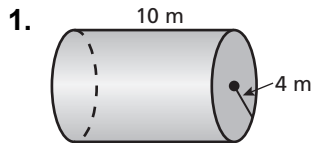
"Then I compute $\frac{355}{113} \approx 3.141593$."

9.3

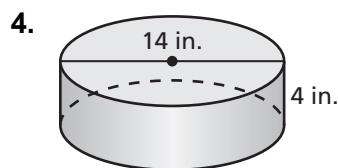
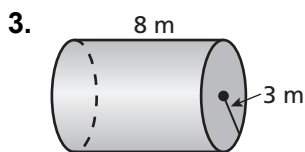
Practice

For use after Lesson 9.3

Find the surface area of the cylinder. Round your answer to the nearest tenth.



Find the lateral surface area of the cylinder. Round your answer to the nearest tenth.



5. How much paper is used in the label for the can of cat food?
Round your answer to the nearest whole number.



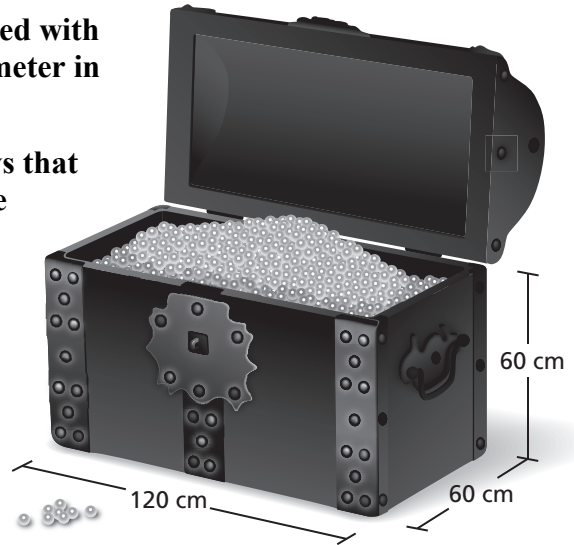
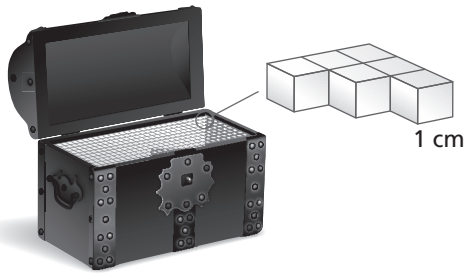
9.4**Volumes of Prisms**

For use with Activity 9.4

Essential Question How can you find the volume of a prism?**1 ACTIVITY:** Pearls in a Treasure Chest

Work with a partner. A treasure chest is filled with valuable pearls. Each pearl is about 1 centimeter in diameter and is worth about \$80.

Use the diagrams below to describe two ways that you can estimate the number of pearls in the treasure chest.

a.**b.**

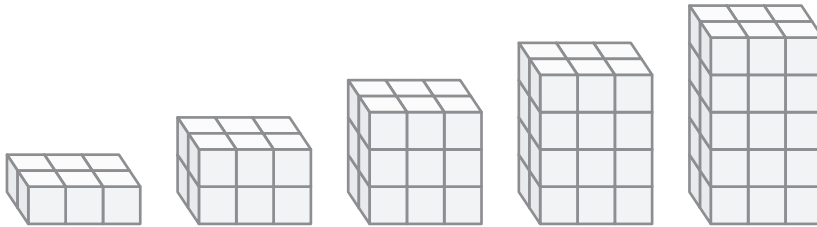
c. Use the method in part (a) to estimate the value of the pearls in the chest.

9.4 Volumes of Prisms (continued)

2 ACTIVITY: Finding a Formula for Volume

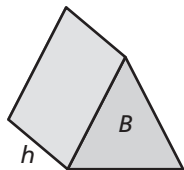
Work with a partner. You know that the formula for the volume of a rectangular prism is $V = \ell wh$.

- Write a formula that gives the volume in terms of the area of the base B and the height h .
- Use both formulas to find the volume of each prism. Do both formulas give you the same volume?

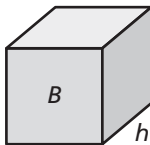


3 ACTIVITY: Finding a Formula for Volume

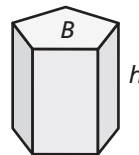
Work with a partner. Use the concept in Activity 2 to find a formula that gives the volume of any prism.



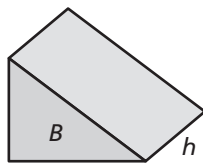
Triangular Prism



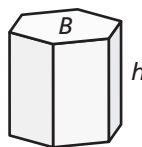
Rectangular Prism



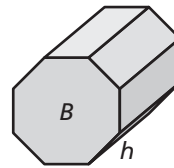
Pentagonal Prism



Triangular Prism



Hexagonal Prism



Octagonal Prism

9.4 Volumes of Prisms (continued)**4 ACTIVITY:** Using a Formula

Work with a partner. A ream of paper has 500 sheets.

- a. Does a single sheet of paper have a volume? Why or why not?

- b. If so, explain how you can find the volume of a single piece of paper.

What Is Your Answer?

5. IN YOUR OWN WORDS How can you find the volume of a prism?

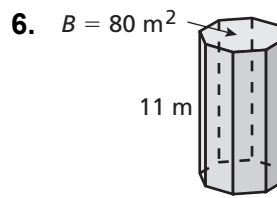
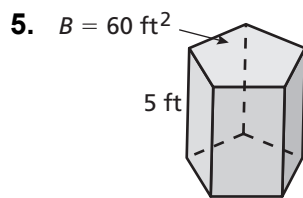
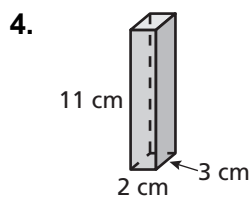
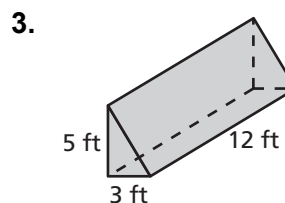
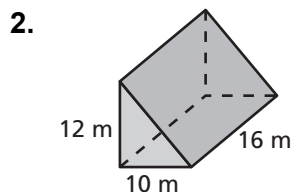
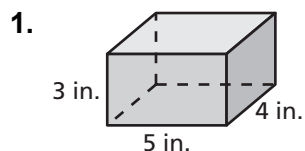
6. STRUCTURE Draw a prism that has a trapezoid as its base. Use your formula to find the volume of the prism.

9.4

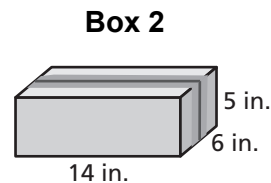
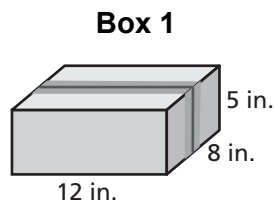
Practice

For use after Lesson 9.4

Find the volume of the prism.



7. Each box is shaped like a rectangular prism. Which has more storage space? Explain.

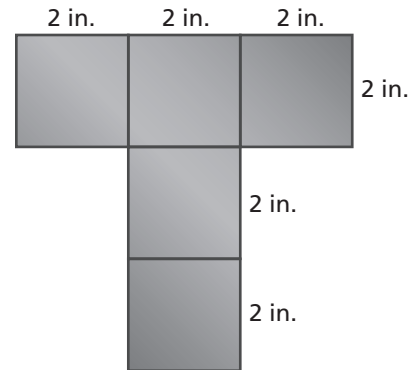
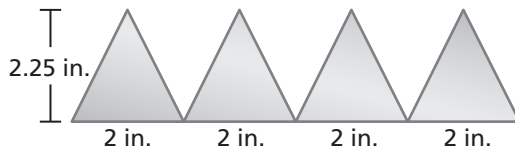


9.5**Volumes of Pyramids**

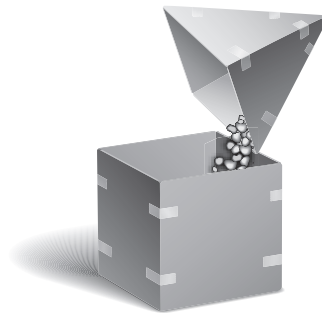
For use with Activity 9.5

Essential Question How can you find the volume of a pyramid?**1 ACTIVITY:** Finding a Formula Experimentally**Work with a partner.**

- **Draw the two nets on cardboard and cut them out.***



- **Fold and tape the nets to form an open square box and an open pyramid.**
- **Both figures should have the same size square base and the same height.**
- **Fill the pyramid with pebbles. Then pour the pebbles into the box. Repeat this until the box is full. How many pyramids does it take to fill the box?**



- **Use your result to find a formula for the volume of a pyramid.**

2 ACTIVITY: Comparing Volumes

Work with a partner. You are an archaeologist studying two ancient pyramids. What factors would affect how long it took to build each pyramid? Given similar conditions, which pyramid took longer to build? Explain your reasoning.

The Sun Pyramid in Mexico
Height: 246 ft
Base: 738 ft by 738 ft

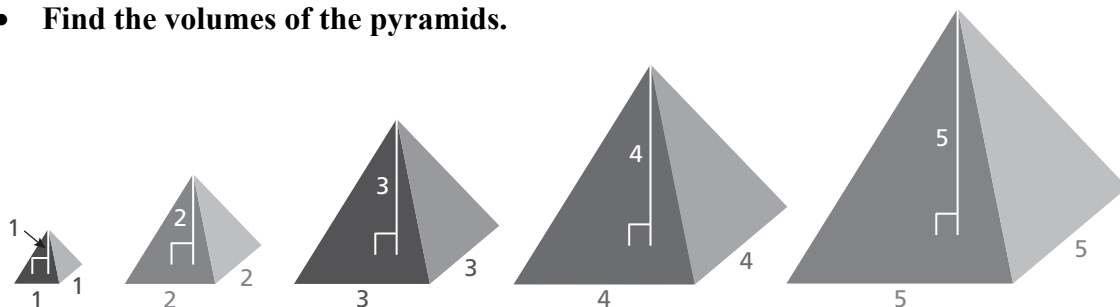
Cheops Pyramid in Egypt
Height: about 480 ft
Base: about 755 ft by 755 ft

*Cut-outs are available in the back of the Record and Practice Journal.

9.5 Volumes of Pyramids (continued)**3 ACTIVITY:** Finding and Using a Pattern

Work with a partner.

- Find the volumes of the pyramids.



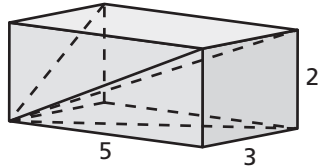
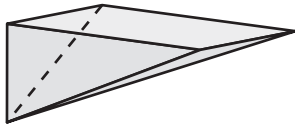
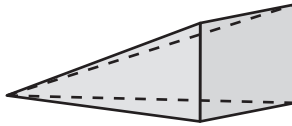
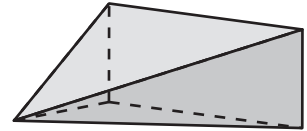
- Organize your results in a table.

Pyramid	Volume (cubic units)
1	
2	
3	
4	
5	

- Describe the pattern.
- Use your pattern to find the volume of a pyramid with a side length and a height of 20.

9.5 Volumes of Pyramids (continued)**4 ACTIVITY:** Breaking a Prism into Pyramids

Work with a partner. The rectangular prism can be cut to form three pyramids. Show that the sum of the volumes of the three pyramids is equal to the volume of the prism.

**a.****b.****c.****What Is Your Answer?**

5. IN YOUR OWN WORDS How can you find the volume of a pyramid?

6. STRUCTURE Write a general formula for the volume of a pyramid.

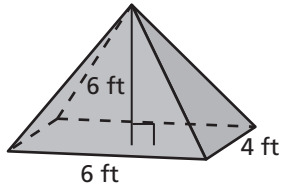
9.5

Practice

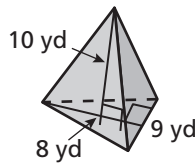
For use after Lesson 9.5

Find the volume of the pyramid.

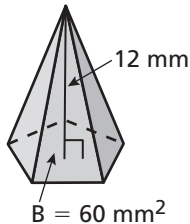
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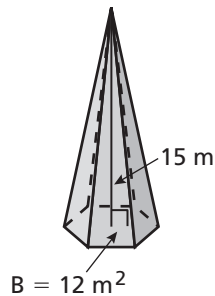
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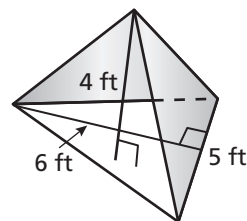
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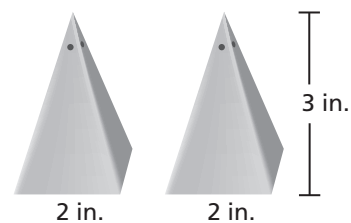
4.



5. You create a simple tent in the shape of a pyramid.
What is the volume of the tent?



6. You work at a restaurant that has 20 tables. Each table has a set of salt and pepper shakers on it that are in the shape of square pyramids. How much salt do you need to fill all the salt shakers?

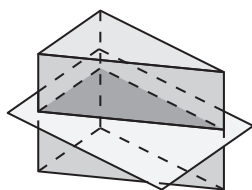


**Extension
9.5**

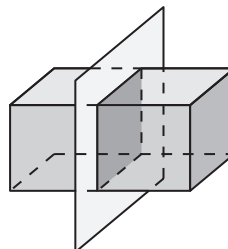
Practice
For use after Extension 9.5

Describe the intersection of the plane and the solid.

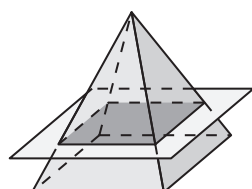
1.



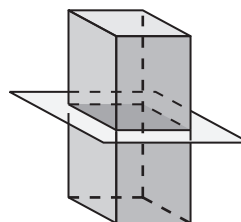
2.



3.



4.

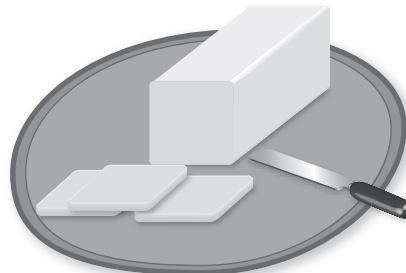


Describe the shape that is formed by the cut made in the food shown.

5.



6.

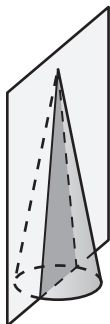


Extension
9.5

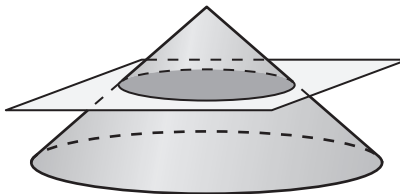
Practice (continued)

Describe the intersection of the plane and the solid.

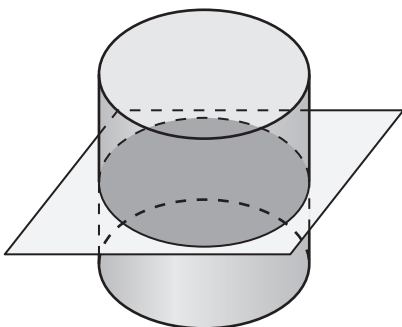
7.



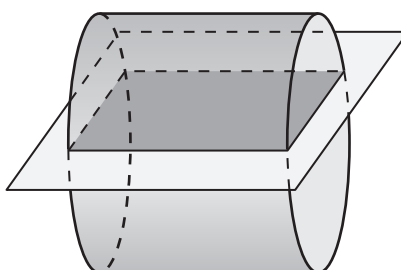
8.



9.

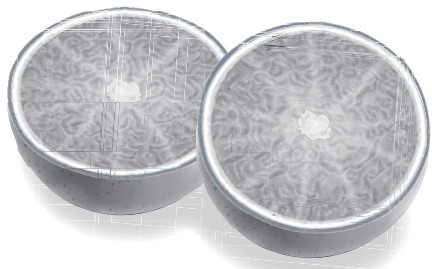


10.



Describe the shape that is formed by the cut made in the food shown.

11.



12.

