

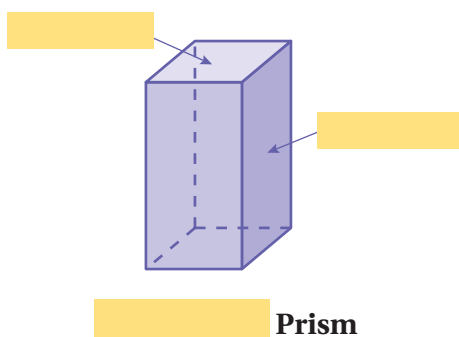
## 8.2 Surface Areas of Prisms

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

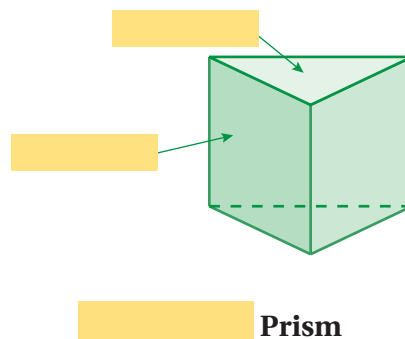
### 1 ACTIVITY: Identifying Prisms

Work with a partner. Label one of the faces as a “base” and the other as a “lateral face.” Use the shape of the base to identify the prism.

a.



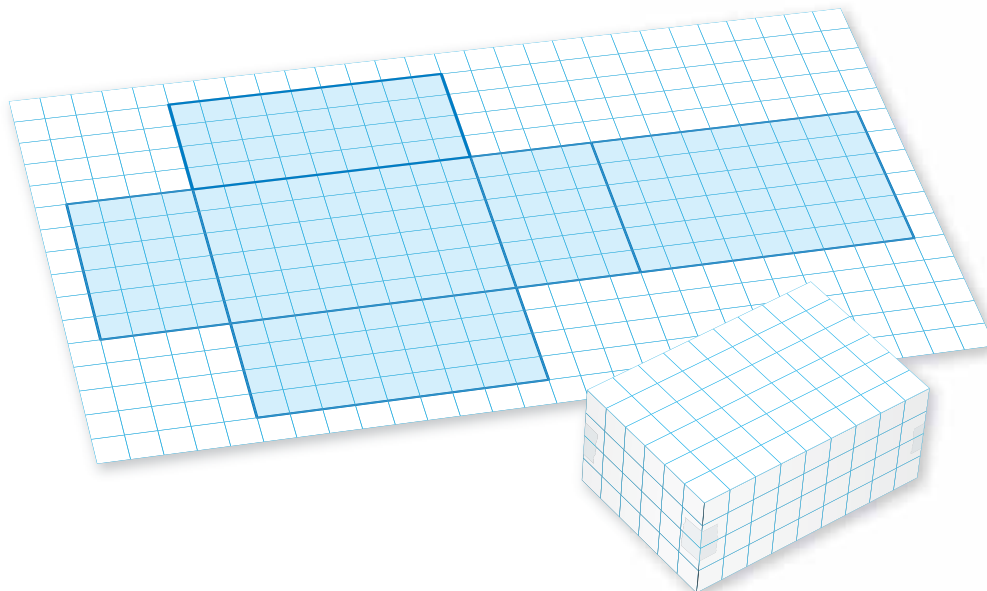
b.



### 2 ACTIVITY: Using Grid Paper to Construct a Prism

Work with a partner.

- Copy the figure shown below onto grid paper.
- Cut out the figure and fold it to form a prism. What type of prism does it form?



#### Geometry

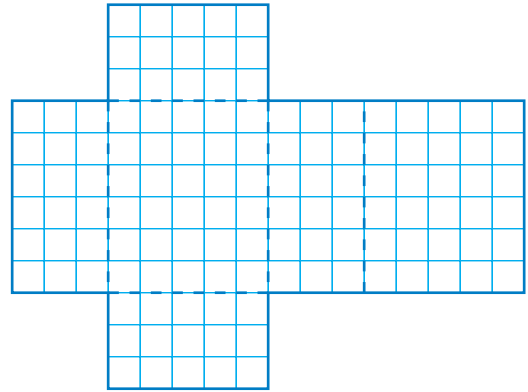
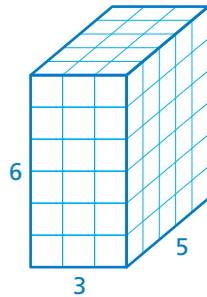
In this lesson, you will

- use nets to represent prisms.
- find the surface area of prisms.
- solve real-life problems.

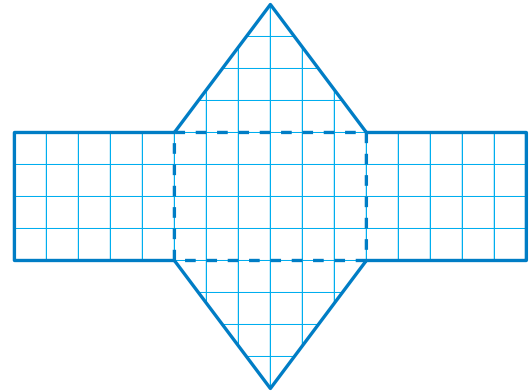
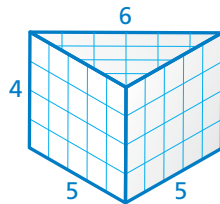
### 3 ACTIVITY: Finding the Area of the Entire Surface of a Prism

Work with a partner. Label each face in the two-dimensional representation of the prism as a “base” or a “lateral face.” Then find the area of the entire surface of each prism.

a.



b.



#### Math Practice

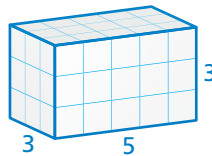
##### Repeat Calculations

When finding the areas of the faces, what calculations do you repeat?

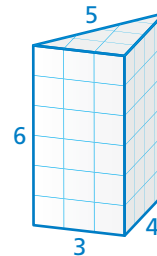
### 4 ACTIVITY: Drawing Two-Dimensional Representations of Prisms

Work with a partner. Draw a two-dimensional representation of each prism. Then find the area of the entire surface of each prism.

a.



b.



## What Is Your Answer?

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

#### Practice

Use what you learned about the area of the entire surface of a prism to complete Exercises 3–5 on page 364.

### Key Vocabulary

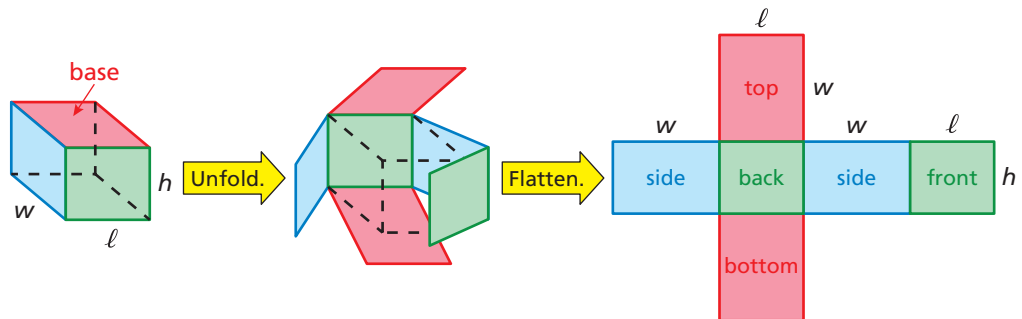
surface area, p. 362  
net, p. 362

The **surface area** of a solid is the sum of the areas of all of its faces. You can use a two-dimensional representation of a solid, called a **net**, to find the surface area of the solid. Surface area is measured in *square units*.

## Key Idea

### Net of a Rectangular Prism

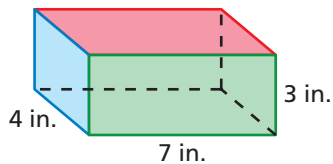
A rectangular prism is a prism with rectangular bases.



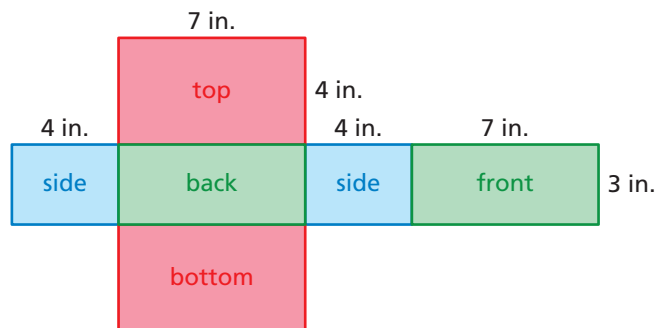
## EXAMPLE 1 Finding the Surface Area of a Rectangular Prism

Find the surface area of the rectangular prism.

Use a net to find the area of each face.



$$\begin{aligned} \text{Top: } & 7 \cdot 4 = 28 \\ \text{Bottom: } & 7 \cdot 4 = 28 \\ \text{Front: } & 7 \cdot 3 = 21 \\ \text{Back: } & 7 \cdot 3 = 21 \\ \text{Side: } & 4 \cdot 3 = 12 \\ \text{Side: } & 4 \cdot 3 = 12 \end{aligned}$$



Find the sum of the areas of the faces.

$$\begin{aligned} \text{Surface Area} &= \text{Area of top} + \text{Area of bottom} + \text{Area of front} + \text{Area of back} + \text{Area of a side} + \text{Area of a side} \\ S &= 28 + 28 + 21 + 21 + 12 + 12 \\ &= 122 \end{aligned}$$

So, the surface area is 122 square inches.

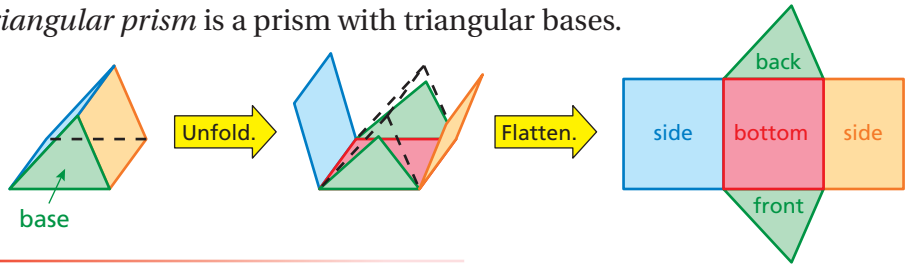
## Key Idea

### Remember

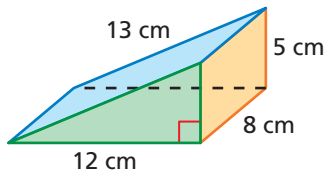
The area  $A$  of a triangle with base  $b$  and height  $h$  is  $A = \frac{1}{2}bh$ .

### Net of a Triangular Prism

A *triangular prism* is a prism with triangular bases.



## EXAMPLE 2 Finding the Surface Area of a Triangular Prism



Find the surface area of the triangular prism.

Use a net to find the area of each face.

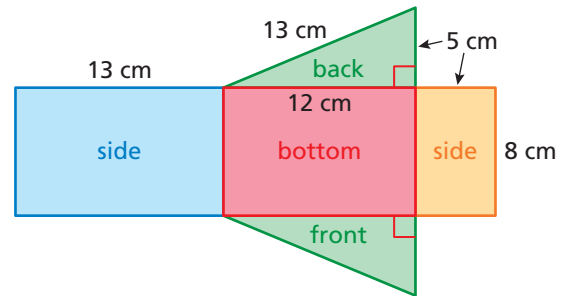
$$\text{Bottom: } 12 \cdot 8 = 96$$

$$\text{Front: } \frac{1}{2} \cdot 12 \cdot 5 = 30$$

$$\text{Back: } \frac{1}{2} \cdot 12 \cdot 5 = 30$$

$$\text{Side: } 13 \cdot 8 = 104$$

$$\text{Side: } 8 \cdot 5 = 40$$



Find the sum of the areas of the faces.

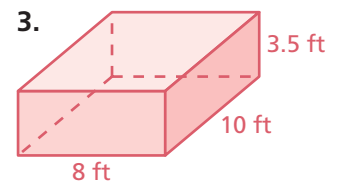
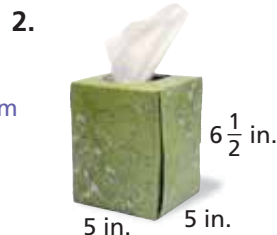
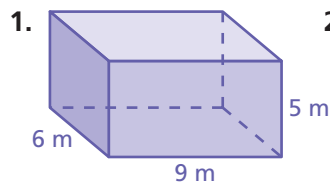
$$\begin{aligned} \text{Surface Area} &= \text{Area of bottom} + \text{Area of front} + \text{Area of back} + \text{Area of a side} + \text{Area of a side} \\ S &= 96 + 30 + 30 + 104 + 40 = 300 \end{aligned}$$

∴ So, the surface area is 300 square centimeters.

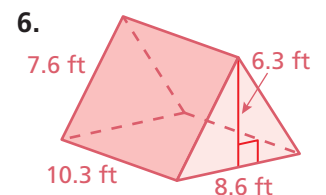
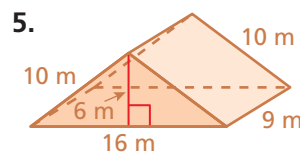
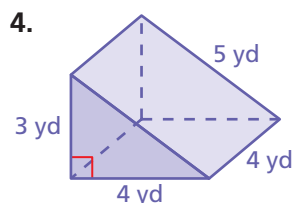
## On Your Own

Now You're Ready  
Exercises 6–11

Find the surface area of the rectangular prism.



Find the surface area of the triangular prism.



## Vocabulary and Concept Check

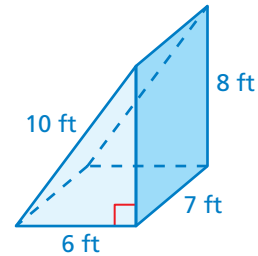
- VOCABULARY** Explain how to find the surface area of a prism.
- DIFFERENT WORDS, SAME QUESTION** Which is different? Find “both” answers.

What is the sum of the areas of the faces of the prism?

What is the area of the entire surface of the prism?

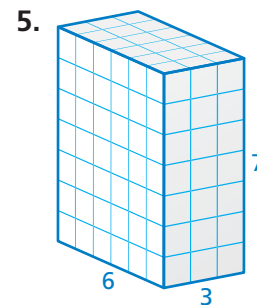
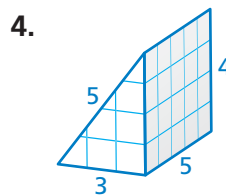
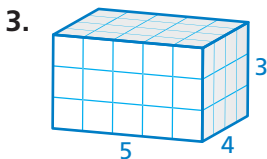
What is the area of the triangular faces of the prism?

What is the surface area of the prism?

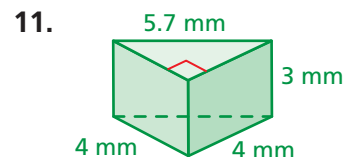
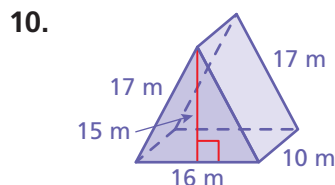
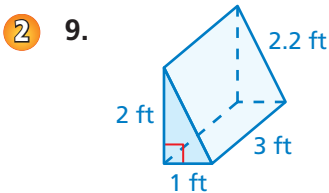
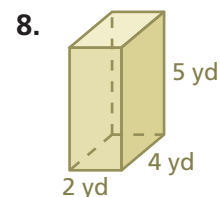
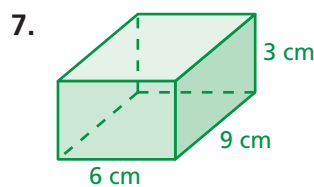
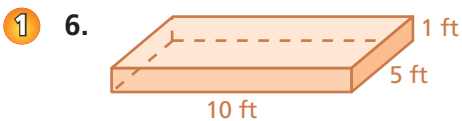


## Practice and Problem Solving

Draw a two-dimensional representation of the prism. Then find the area of the entire surface of the prism.



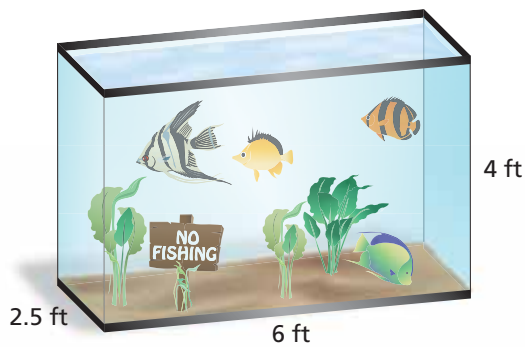
Find the surface area of the prism.



12. **GIFT BOX** A gift box in the shape of a rectangular prism measures 8 inches by 8 inches by 10 inches. What is the least amount of wrapping paper needed to wrap the gift box? Explain.

13. **TENT** What is the least amount of fabric needed to make the tent?

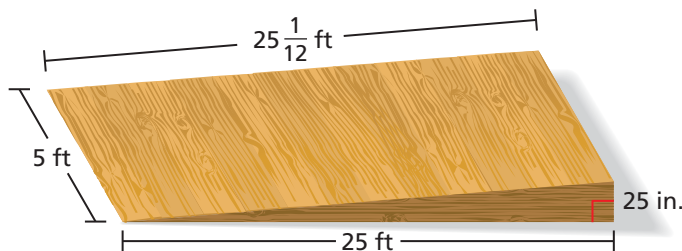




14. **AQUARIUM** A public library has an aquarium in the shape of a rectangular prism. The base is 6 feet by 2.5 feet. The height is 4 feet. How many square feet of glass were used to build the aquarium? (The top of the aquarium is open.)

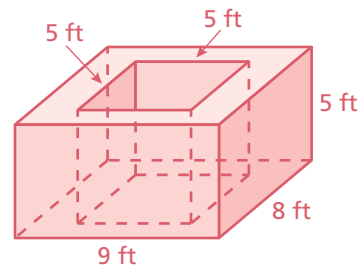
15. **STORAGE BOX** The material used to make a storage box costs \$1.25 per square foot. The boxes have the same volume. How much does a company save by choosing to make 50 of Box 2 instead of 50 of Box 1?

	Length	Width	Height
Box 1	20 in.	6 in.	4 in.
Box 2	15 in.	4 in.	8 in.



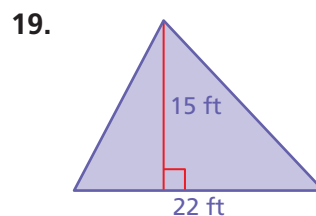
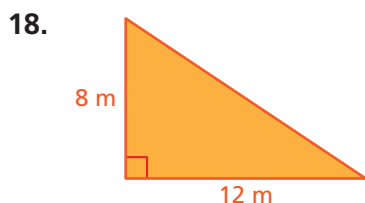
16. **RAMP** A quart of stain covers 100 square feet. How many quarts should you buy to stain the wheelchair ramp? (Assume you do not have to stain the bottom of the ramp.)

17. **Critical Thinking** A cube is removed from a rectangular prism. Find the surface area of the figure after removing the cube.



## Fair Game Review What you learned in previous grades & lessons

Find the area of the triangle. (Section 4.2)



21. **MULTIPLE CHOICE** Which value is *not* a solution of the inequality  $x - 4 \geq 2$ ? (Section 7.5)

- (A)  $x = 10$       (B)  $x = 6$       (C)  $x = 4$       (D)  $x = 14$