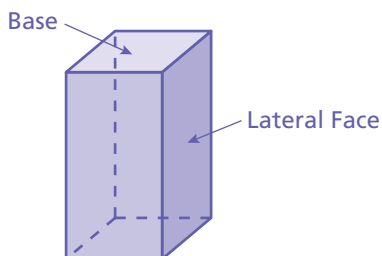


6.2 Surface Areas of Prisms

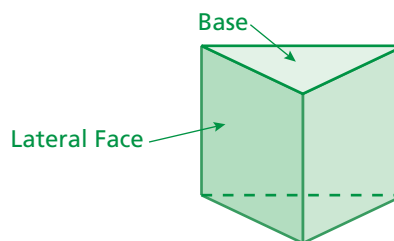


STANDARDS
OF LEARNING
8.7

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



Rectangular Prism



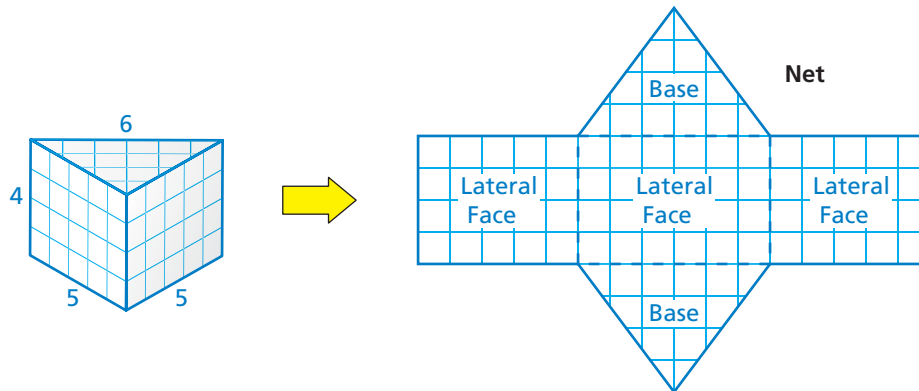
Triangular Prism

The **surface area** of a prism is the sum of the areas of all its faces. A two-dimensional representation of a solid is called a **net**.

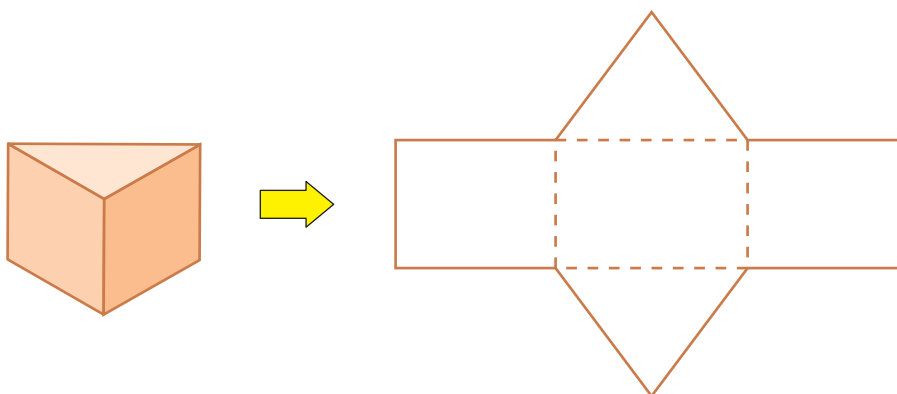
1 ACTIVITY: Surface Area of a Triangular Prism

Work with a partner.

- a. Use the net for the triangular prism to find its surface area.



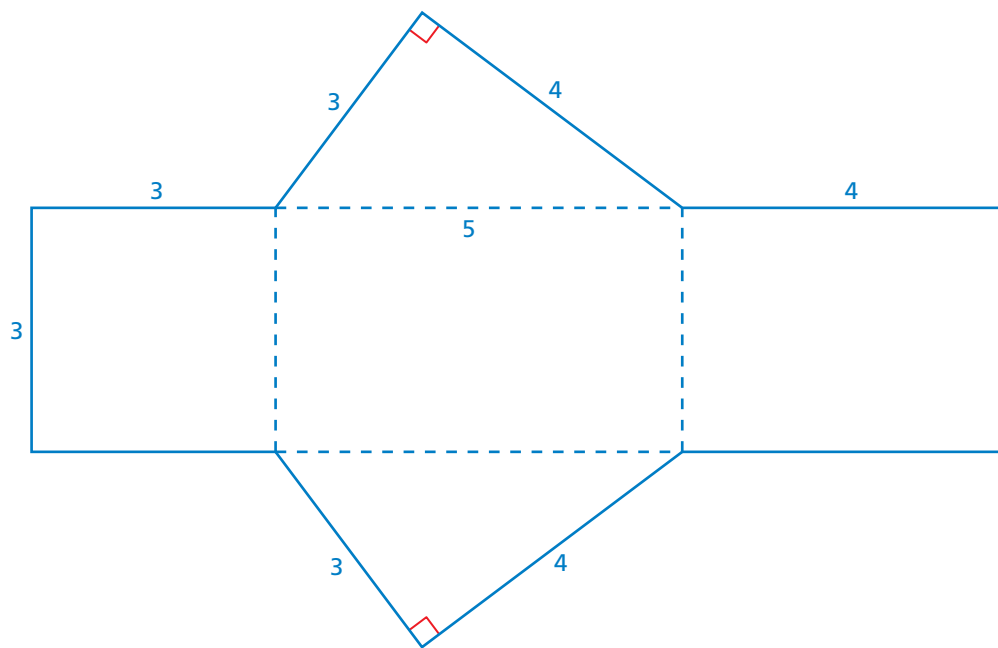
- b. Copy the net for a triangular prism. Label each side. Then use your drawing to write a formula for the surface area of a triangular prism.



2

ACTIVITY: Finding Surface Area**Work with a partner.**

- a. Find the surface area of the solid shown by the net. Copy the net, cut it out, and fold it to form a solid. Identify the solid.



- b. Which of the surfaces of the solid are bases? Why?
- c. Double the height of the solid. Does this double the surface area? Explain your reasoning.

What Is Your Answer?

3. **IN YOUR OWN WORDS** How can you use a formula to find the surface area of a prism?
4. Find examples of prisms in your classroom. Measure each item and determine its surface area. For each item, give an example of how finding the surface area is important in knowing how much money is needed to manufacture or build the item.

Practice

Use what you learned about the surface area of a prism to complete Exercises 6–8 on page 268.

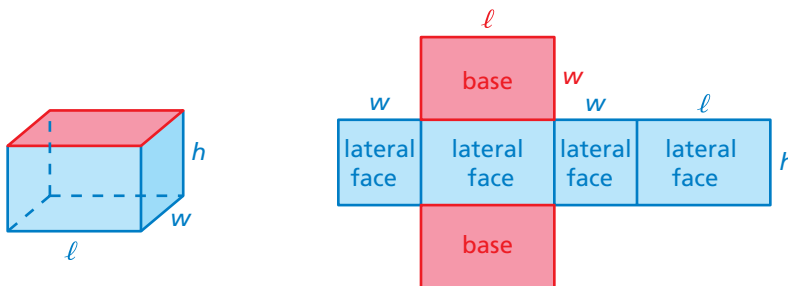
Key Vocabulary

surface area, p. 264
net, p. 264

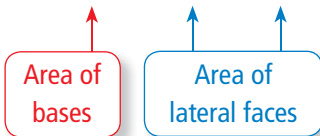
Key Idea

Surface Area of a Rectangular Prism

Words The surface area S of a rectangular prism is the sum of the areas of the bases and the lateral faces.



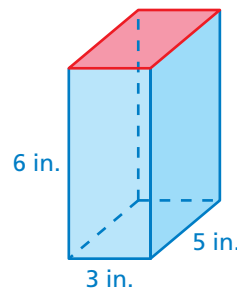
Algebra $S = 2lw + 2lh + 2wh$



EXAMPLE 1 Finding the Surface Area of a Rectangular Prism

Find the surface area of the prism.

$$\begin{aligned} S &= 2lw + 2lh + 2wh \\ &= 2(5)(3) + 2(5)(6) + 2(3)(6) \\ &= 30 + 60 + 36 \\ &= 126 \end{aligned}$$

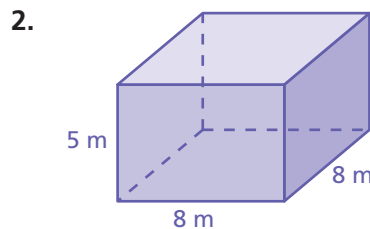
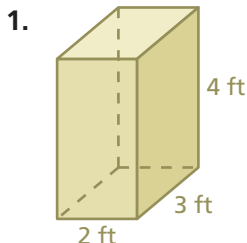


∴ The surface area is 126 square inches.

On Your Own

Find the surface area of the prism.

Now You're Ready
Exercises 9–11



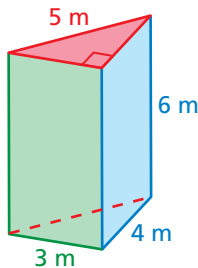
Key Idea

Surface Area of a Prism

The surface area S of any prism is the sum of the areas of the bases and the lateral faces.

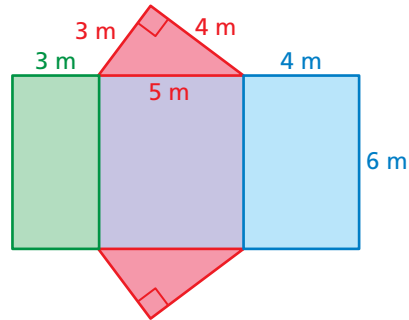
$$S = \text{areas of bases} + \text{areas of lateral faces}$$

EXAMPLE 2 Finding the Surface Area of a Triangular Prism



Find the surface area of the prism.

Draw a net.



Area of a base

$$\text{Red base: } \frac{1}{2} \cdot 3 \cdot 4 = 6$$

Areas of lateral faces

$$\text{Green lateral face: } 6 \cdot 3 = 18$$

$$\text{Purple lateral face: } 6 \cdot 5 = 30$$

$$\text{Blue lateral face: } 6 \cdot 4 = 24$$

Remember

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

Add the areas of the bases and the lateral faces.

$$S = \text{areas of bases} + \text{areas of lateral faces}$$

$$= 6 + 6 + 18 + 30 + 24$$

$$= 84$$

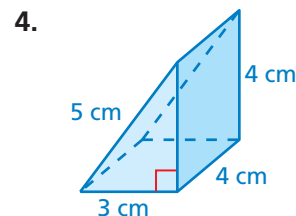
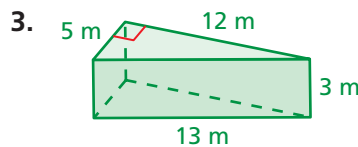
There are two identical bases. Count the area twice.

∴ The surface area is 84 square meters.

On Your Own

Find the surface area of the prism.

Now You're Ready
Exercises 12–14

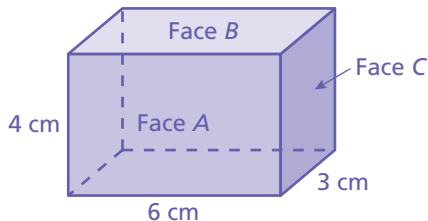


Vocabulary and Concept Check

- OPEN-ENDED** Describe a real-world situation in which you would want to find the surface area of a prism.

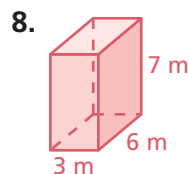
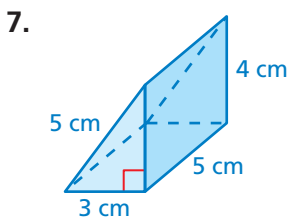
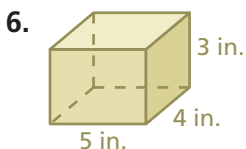
Find the indicated area for the rectangular prism.

- Area of Face A
- Area of Face B
- Area of Face C
- Surface area of the prism

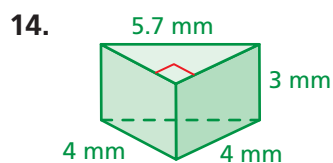
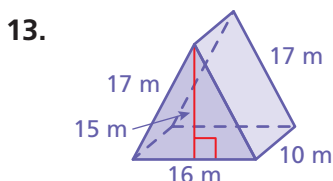
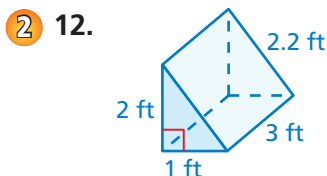
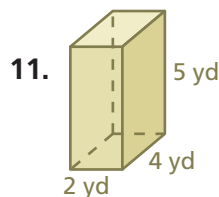
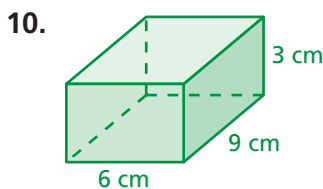
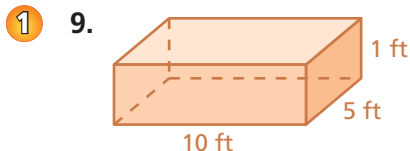


Practice and Problem Solving

Draw a net for the prism. Then find the surface area.



Find the surface area of the prism.

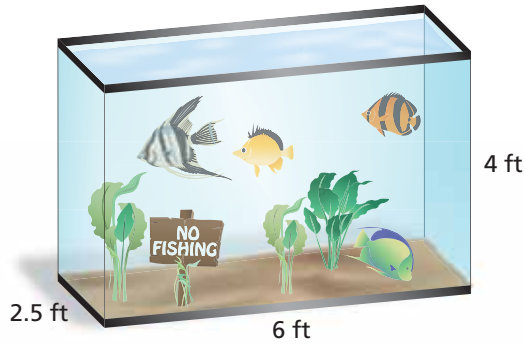
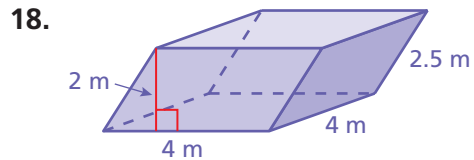
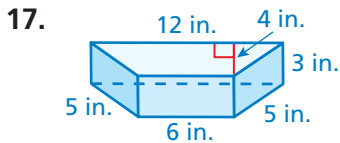


15. **GIFT BOX** What is the least amount of wrapping paper needed to wrap a gift box that measures 8 inches by 8 inches by 10 inches? Explain.

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



Find the surface area of the prism.



19. **AQUARIUM** An aquarium is in the shape of a rectangular prism.

- How many square feet of glass were used to build the aquarium? (The top of the aquarium is open.)
- All three dimensions of a second aquarium are twice the size of the first aquarium. How much glass is needed to build this aquarium?
- How does doubling all of the dimensions affect the amount of glass needed to build the aquarium?

20. **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.

21. **LABEL** A label that wraps around a box of golf balls covers 75% of its lateral surface area. What is the value of x ?

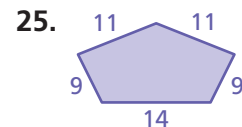
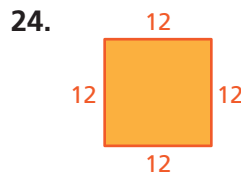
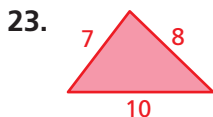


22. **Critical Thinking** Write a formula for the surface area of a rectangular prism using the height h , the perimeter P of a base, and the area B of a base.



Fair Game Review What you learned in previous grades & lessons

Find the perimeter. *(Skills Review Handbook)*



26. **MULTIPLE CHOICE** The class size increased 25% to 40 students. What was the original class size? *(Section 4.2)*

(A) 10

(B) 30

(C) 32

(D) 50