



## Surface Area of a Prism

**Goal:** Find the surface area of a prism.



### Vocabulary

Surface area: *area of all of the sides of a 3-D figure*

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

Find the surface area of the rectangular prism.

1. Find the area of each face.

Area of the top or bottom face:

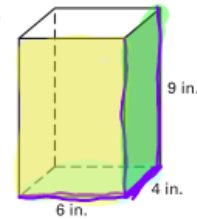
$$4 \times 6 = 24 \text{ in}^2$$

Area of the front or back face:

$$6 \times 9 = 54 \text{ in}^2$$

Area of the left or right face:

$$4 \times 9 = 36 \text{ in}^2$$



2. Add the areas of all six faces to find the surface area.

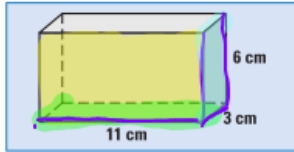
$$S = 24 + 24 + 54 + 54 + 36 + 36$$

$$= 228 \text{ in}^2$$

**Answer:** The surface area is **228** square inches.

**EXAMPLE 2 Drawing a Diagram**

Find the surface area of a rectangular prism that is 11 centimeters by 3 centimeters by 6 centimeters.



$front/back: 11 \cdot 6 = 66 \cdot 2 = 132 \text{ cm}^2$   
 $left/right: 3 \cdot 6 = 18 \cdot 2 = 36 \text{ cm}^2$   
 $top/bottom: 11 \cdot 3 = 33 \cdot 2 = 66 \text{ cm}^2$   
 $+ 234 \text{ cm}^2$

*← both sides*

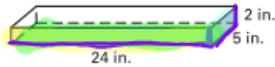
1. Draw a diagram of the prism and label the dimensions.
2. Find the area of each face. Then add these areas to find the surface area.

$$\begin{aligned}
 S &= (\square \times \square) + (\square \times \square) + (\square \times \square) \\
 &\quad + (\square \times \square) + (\square \times \square) + (\square \times \square) \\
 &= \square + \square + \square + \square + \square + \square \\
 &= \square
 \end{aligned}$$

**Answer:** The prism has a surface area of  $\square$  square centimeters.

**EXAMPLE 3 Using Surface Area**

**Bookshelf** A woodworker is putting a veneer, or a thin piece of expensive wood, on a less expensive board to make the bookshelf shown. The woodworker has 350 square inches of veneer. Is there enough veneer to complete the shelf?



$f/b: 24 \cdot 2 = 48 \cdot 2 = 96 \text{ in}^2$   
 $l/r: 5 \cdot 2 = 10 \cdot 2 = 20 \text{ in}^2$   
 $t/b: 24 \cdot 5 = 120 \cdot 2 = 240 \text{ in}^2$   
 $+ 356 \text{ in}^2$

**Solution**

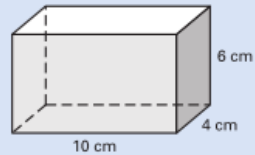
Find the surface area of the shelf and compare it to the amount of veneer available.

$$\begin{aligned}
 S &= \square + \square + \square + \square + \square + \square \\
 &= \square
 \end{aligned}$$

**Answer:** The surface area of the shelf is 356 square inches. There are 350 square inches of veneer available. The woodworker does not have enough veneer to complete the shelf.

**Your turn now** In Exercises 2 and 3, you may want to draw a diagram.

1. Find the surface area of the rectangular prism shown.



2. A rectangular prism is 2 meters by 5 meters by 5 meters. Find its surface area.

3. You want to paint a door that is 35 inches by 2 inches by 78 inches. The label on the can of paint says the paint covers a total area of 6000 square inches. Do you have enough paint to put 2 coats of paint on the door?

$$\begin{aligned} \text{f/b: } 35 \cdot 78 &= 2,730 \cdot 2 = 5,460 \\ \text{l/r: } 2 \cdot 78 &= 156 \cdot 2 = 312 \\ \text{t/b: } 35 \cdot 2 &= 70 \cdot 2 = \underline{140} \end{aligned}$$

Not enough  
paint

$$\begin{array}{r} 5,912 \text{ in}^2 \\ \times 2 \leftarrow 2 \text{ coats} \\ \hline 11,824 \text{ in}^2 \end{array}$$

