



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:

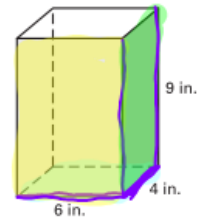
$$4 \times 6 = 24 \text{ in}^2$$

Area of the front or back face:

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

Area of the left or right face:

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



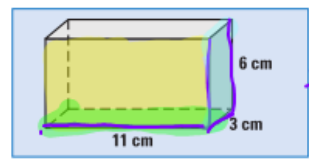
2. Add the areas of all six faces to find the surface area.

$$S = 24 + 24 + 54 + 54 + 36 + 36 = 228 \text{ in}^2$$

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

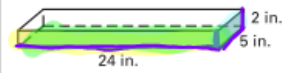
1. Draw a diagram of the prism and label the dimensions.
2. Find the area of each face. Then add these areas to find the surface area.

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

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

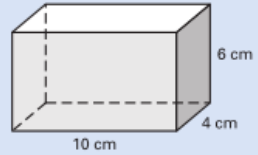
Find the surface area of the shelf and compare it to the amount of veneer available.

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

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?