

Lesson 11-4

Example 1 Surface Area of a Rectangular Prism

Find the surface area of the rectangular prism.

$$S = 2\ell w + 2\ell h + 2wh$$

Write the formula.

$$S = 2(15)(4) + 2(15)(6) + 2(4)(6)$$

Substitution

$$S = 348$$

Simplify.

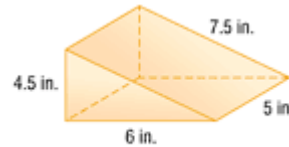


The surface area of the prism is 348 square inches.

Example 2 Surface Area of a Triangular Prism

Find the surface area of the triangular prism.

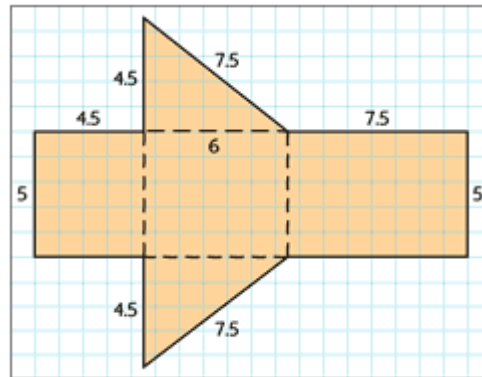
One way to easily see all the surfaces of the prism is to draw a net on grid paper and label the dimensions of each face.



Find the area of each face.

$$\left. \begin{array}{l} \text{bottom} \quad 6 \cdot 5 = 30 \\ \text{left side} \quad 4.5 \cdot 5 = 22.5 \\ \text{right side} \quad 7.5 \cdot 5 = 37.5 \end{array} \right\} A = \ell w$$

$$\text{two bases} \quad 2 \left(\frac{1}{2} \cdot 6 \cdot 4.5 \right) = 27 \quad A = \frac{1}{2} bh$$



Add to find the total surface area.

$$108 + 45 + 117 + 60 = 330$$

The surface area of the triangular prism is 330 square feet.

Example 3 Surface Area of a Cylinder

Find the surface area of a cylinder having a radius of 6 cm and a height of 15 cm. Round to the nearest tenth.

$$S = 2\pi r^2 + 2\pi rh$$

Formula for surface area of cylinder

$$S = 2\pi(6)^2 + 2\pi(6)(15)$$

Replace r with 6 and h with 15.

$$S \approx 791.7$$

Simplify.

The surface area is about 791.7 square centimeters.

Example 4 Compare Surface Areas

PACKAGING A manufacturing company is deciding between two packaging styles. The first is a rectangular prism having length 4 inches, width 3 inches and height 5 inches. The second is a cylinder having radius 4 inches and height 6 inches. Which style has the least surface area?

Surface Area of Rectangular Prism Style

$$\begin{array}{l} \underbrace{\quad}_{\text{top/bottom}} \quad \underbrace{\quad}_{\text{sides}} \quad \underbrace{\quad}_{\text{front/back}} \\ S = 2\ell w + 2\ell h + 2wh \quad \text{Formula for surface area} \\ S = 2(4)(3) + 2(4)(5) + 2(3)(5) \quad \text{Substitution.} \\ S = 94 \quad \text{Simplify.} \end{array}$$

Surface Area of Cylinder Style

$$\begin{array}{l} \underbrace{\quad}_{\text{top/bottom}} \quad \underbrace{\quad}_{\text{curved surface}} \\ S = 2\pi r^2 + 2\pi r h \quad \text{Formula for surface area of cylinder} \\ S = 2\pi(4)^2 + 2\pi(4)(6) \quad \text{Replace } r \text{ with 4 and } h \text{ with 6.} \\ S \approx 251.3 \quad \text{Simplify.} \end{array}$$

Since 94 square inches < 251.3 square inches, the rectangular prism style has the least surface area.