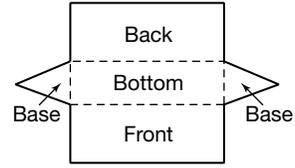
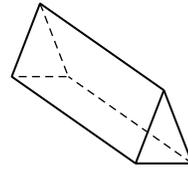


# 11-4 Surface Area: Prisms and Cylinders (Pages 573–577)

In geometry, a solid like a cardboard box is called a **prism**. A prism is a solid figure that has two parallel, congruent sides, called **bases**. A prism is named by the shape of its bases. For example, a prism with rectangular-shaped bases is a **rectangular prism**. A prism with triangular-shaped bases is a **triangular prism**. A **cylinder** is a geometric solid whose bases are parallel, congruent circles. The **surface area** of a geometric solid is the sum of the areas of each side or **face** of the solid. If you open up or unfold a prism, the result is a **net**. Nets help you identify all the faces of a prism.



A triangular prism has five faces.

**Examples** Find the surface area of the given geometric solids.

- a. a box measuring 6 in. × 8 in. × 12 in.**

Find the surface area of the faces. Use the formula  $A = \ell w$ . Multiply each area by 2 because there are two faces with each area.

Front and Back:  $6 \times 8 = 48$  (each)  
 Top and Bottom:  $12 \times 8 = 96$  (each)  
 Two Sides:  $6 \times 12 = 72$  (each)  
 Total:  $2(48) + 2(96) + 2(72) = 432 \text{ in}^2$

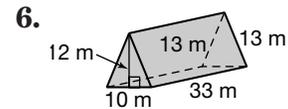
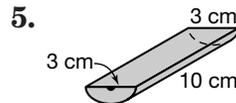
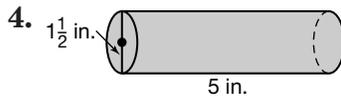
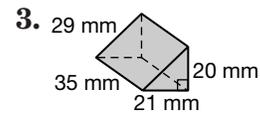
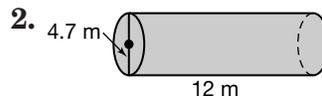
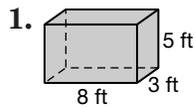
- b. a cylinder with a radius of 10 cm and a height of 24 cm**

The surface area of a cylinder equals the area of the two circular bases,  $2\pi r^2$ , plus the area of the curved surface. If you make a net of a cylinder, you see that the curved surface is really a rectangle with a height that is equal to the height  $h$  of the cylinder and a length that is equal to the circumference of the circular bases,  $2\pi r$ .

Surface area =  $2\pi r^2 + h \cdot 2\pi r$   
 Surface area =  $2\pi(100) + 48\pi(10)$   
 Surface area  $\approx 628.3 + 1508.0$   
 Surface area  $\approx 2136.3 \text{ cm}^2$

## Practice

Find the surface area of each solid. Round to the nearest tenth.



7. **Pets** A pet store sells nylon tunnels for dog agility courses. If a tunnel is 6 feet long and  $1\frac{1}{2}$  feet in diameter, how many square feet of nylon is used?

8. **Standardized Test Practice** The height of a cylinder is 10 meters and its diameter is 4 meters. What is its surface area?

- A**  $75.4 \text{ m}^2$       **B**  $138.2 \text{ m}^2$       **C**  $150.8 \text{ m}^2$       **D**  $351.9 \text{ m}^2$

Answers: 1. 158 ft<sup>2</sup> 2. 2111.9 m<sup>2</sup> 3. 2,870 mm<sup>2</sup> 4. 27.1 in<sup>2</sup> 5. 54.2 cm<sup>2</sup> 6. 1,308 m<sup>2</sup> 7. about 28.3 ft<sup>2</sup> 8. C