

Reteaching with Practice

For use with pages 728–734

GOAL**Find the surface area of a prism and find the surface area of a cylinder****VOCABULARY**

A **prism** is a polyhedron with two congruent faces, called **bases**, that lie in parallel planes. The other faces are parallelograms formed by connecting the corresponding vertices of the bases and are called **lateral faces**.

In a **right prism**, each lateral edge is perpendicular to both bases.

Prisms that have lateral edges that are not perpendicular to the bases are **oblique prisms**.

The **surface area of a polyhedron** is the sum of the areas of its faces.

The **lateral area of a polyhedron** is the sum of the areas of its lateral faces.

The two-dimensional representation of all of a prism's faces is called a **net**.

A **cylinder** is a solid with congruent circular bases that lie in parallel planes.

A cylinder is called a **right cylinder** if the segment joining the centers of the bases is perpendicular to the bases.

The **lateral area of a cylinder** is the area of its curved surface and is equal to the product of the circumference and the height.

The entire **surface area of a cylinder** is equal to the sum of the lateral area and the areas of the two bases.

Theorem 12.2 Surface Area of a Right Prism

The surface area S of a right prism can be found using the formula $S = 2B + Ph$, where B is the area of a base, P is the perimeter of a base, and h is the height.

Theorem 12.3 Surface Area of a Right Cylinder

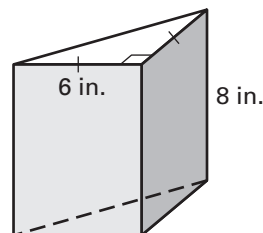
The surface area S of a right cylinder is

$$S = 2B + Ch = 2\pi r^2 + 2\pi rh,$$

where B is the area of a base, C is the circumference of a base, r is the radius of a base, and h is the height.

EXAMPLE 1**Finding the Surface Area of a Prism Using Theorem 12.2**

Find the surface area of the right prism.



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SOLUTION

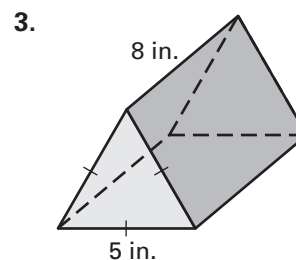
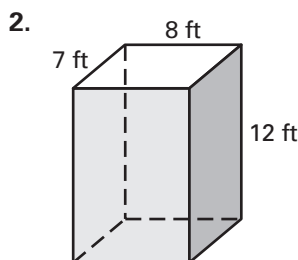
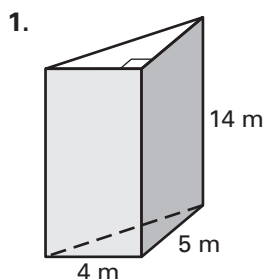
Each base of the prism is a right triangle with base and height of 6 inches. Using the formula for the area of a triangle, the area of each base is $B = \frac{1}{2}(6)(6) = 18$ square inches.

To find the perimeter of each base, you need to find the length of the third side of the triangle. Because the triangle is an isosceles right triangle, it is a 45° - 45° - 90° triangle. So, the hypotenuse is $6\sqrt{2}$. The perimeter of each base is $P = 6 + 6 + 6\sqrt{2} = 12 + 6\sqrt{2}$. So, the surface area is

$$S = 2B + Ph = 2(18) + (12 + 6\sqrt{2})(8) \approx 199.9 \text{ square inches.}$$

Exercises for Example 1

Find the surface area of the right prism.

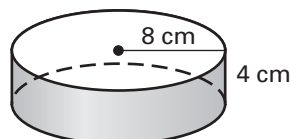


EXAMPLE 2 Finding the Surface Area of a Cylinder

Find the surface area of the right cylinder.

SOLUTION

The cylinder has an 8 cm radius and a 4 cm height.



$S = 2\pi r^2 + 2\pi rh$	Formula for surface area of a right cylinder
$= 2\pi(8)^2 + 2\pi(8)(4)$	Substitute.
$= 128\pi + 64\pi$	Simplify.
$= 192\pi$	Add.
≈ 603.2	Use a calculator.

The surface area is about 603.2 square centimeters.

Exercises for Example 2

Find the surface area of the right cylinder.

