LESSON 12.3

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Reteaching with Practice

For use with pages 735–742

GOAL **Find the surface area of a pyramid and find the surface area of a cone**

VOCABULARY

A **pyramid** is a polyhedron in which the base is a polygon and the lateral faces are triangles with a common vertex.

The intersection of two lateral faces of a pyramid is called a **lateral edge**.

The intersection of the base of a pyramid and a lateral face is called a **base edge**.

The **altitude**, or **height**, of a pyramid is the perpendicular distance between the base and the vertex.

A **regular pyramid** has a regular polygon for a base and its height meets the base at its center.

The **slant height** of a regular pyramid is the altitude of any lateral face.

A **circular cone**, or **cone**, has a circular base and a vertex that is not in the same plane as the base.

The **altitude**, or **height**, is the perpendicular distance between the vertex and the base.

In a **right cone**, the height meets the base at its center.

In a right cone, the **slant height** is the distance between the vertex and a point on the base edge.

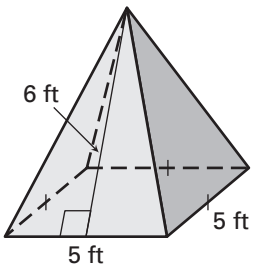
The **lateral surface** of a cone consists of all segments that connect the vertex with points on the base edge.

Theorem 12.4 Surface Area of a Regular Pyramid
The surface area S of a regular pyramid is $S = B + \frac{1}{2}P\ell$, where B is the area of the base, P is the perimeter of the base, and ℓ is the slant height.

Theorem 12.5 Surface Area of a Right Cone
The surface area S of a right cone is $S = \pi r^2 + \pi r\ell$, where r is the radius of the base and ℓ is the slant height.

EXAMPLE 1 ***Finding the Surface Area of a Pyramid***

Find the surface area of the regular pyramid shown.



SOLUTION

To find the surface area of the regular pyramid, start by finding the area of the base.

Because the base is a square, the area is s^2. So, the area of the base is 5^2, or 25 square feet.

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Now you can find the surface area, using 25 for the area of the base, B.

$S = B + \frac{1}{2}P\ell$ Write formula.

$= 25 + \frac{1}{2}(4 \cdot 5)(6)$ Substitute.

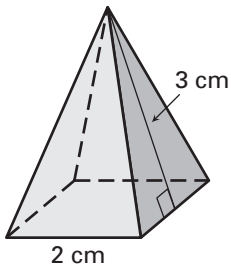
$= 85$ Simplify.

So, the surface area is 85 square feet.

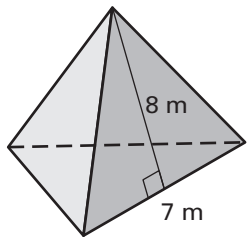
Exercises for Example 1

Find the surface area of the regular pyramid.

1.



2.



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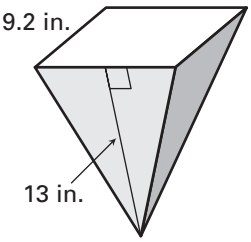
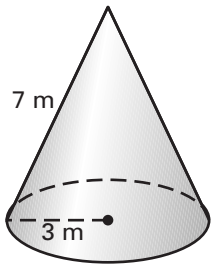


EXAMPLE 2 Finding the Surface Area of a Cone

Find the surface area of the right cone shown.



SOLUTION

With a radius of 3 meters and a slant height of 7 meters given, use the formula to find the surface area.

$S = \pi r^2 + \pi r\ell$ Write formula.

$= \pi(3)^2 + \pi(3)(7)$ Substitute.

$= 9\pi + 21\pi$ Simplify.

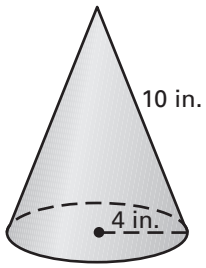
$= 30\pi$ Simplify.

So, the surface area of the cone is 30π square meters, or about 94.2 square meters.

Exercises for Example 2

Find the surface area of the right cone.

4.



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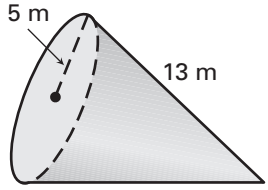

6.