Chapter 8 Lesson 4

Surface Area of a Cylinder
Quick Check

Use the solve a simpler problem strategy to solve each problem.

1. Jill needs to cut a piece of string into 20 smaller pieces. How many times will she need to cut the string?

2. Miranda is making a piñata like the shape shown at right. She wants to fill the piñata with candy. How much candy will she need to fill the piñata?

3. TEST PRACTICE A serving dish consists of three cylinders. Each cylinder has a diameter of 6 inches and a height of 4 inches. What is the volume of the serving dish?

A. 113.1 cubic inches
B. 226.2 cubic inches
C. 339.3 cubic inches
D. 452.4 cubic inches
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A. 113.1 cubic inches
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ANSWERS
1. 19 times
2. 8,639.4 in³
3. C
Objective

• find the lateral and total surface area of a cylinder
Surface Area

The lateral area of a three-dimensional figure is the surface area of the figure, excluding the area of the base(s). So, the lateral area of a cylinder is the area of curved surface.

The total surface area of a three-dimensional figure is the sum of the areas of all its surfaces.

What is the difference between volume and surface area?
If the lateral area is $2\pi rh$, what do you think the formula is for the surface area of a cylinder? And why?
Surface Area of a Cylinder

**Lateral Area**

**Words**

The lateral area $L.A.$ of a cylinder with height $h$ and radius $r$ is the circumference of the base times the height.

**Symbols**

$L.A. = 2\pi rh$

**Total Surface Area**

**Words**

The surface area $S.A.$ of a cylinder with height $h$ and radius $r$ is the lateral area plus the area of the two circular bases.

**Symbols**

$S.A. = L.A. + 2\pi r^2$ or $S.A. = 2\pi rh + 2\pi r^2$

**Model**

![Diagram of a cylinder with lateral area and base area calculations](image)
In the diagram above, the length of the rectangle is the same as the circumference of the circle, $2\pi r$. Also, the width of the rectangle is the same as the height of the cylinder.
Find the surface area of the cylinder.
Round to the nearest tenth.

\[
S.A. = 2\pi rh + 2\pi r^2
\]

Surface area of a cylinder

S.A. = 2\pi(2)(7) + 2\pi(2)^2

Replace \( r \) with 2 and \( h \) with 7.
Example 1

Find the surface area of the cylinder. Round to the nearest tenth.

\[ \text{S.A.} = 2\pi rh + 2\pi r^2 \]

\[ \text{S.A.} = 2\pi(2)(7) + 2\pi(2)^2 \]

Surface area of a cylinder

Replace \( r \) with 2 and \( h \) with 7.

\[ \text{S.A.} \approx 113.1 \]
Example 2

A circular fence that is 2 feet high is to be built around the outside of a carousel. The distance from the center of the carousel to the edge of the fence will be 35 feet. What is the area of the fencing material that is needed to make the fence around the carousel?
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You need to find the lateral area. The radius of the circular fence is 35 feet. The height is 2 feet.

\[ L.A. = 2\pi rh \]  
Lateral area of a cylinder

\[ L.A. = 2\pi(35)(2) \]  
Replace \( r \) with 35 and \( h \) with 2.

\[ L.A. \approx 439.8 \]  
Simplify.

So, about 439.8 square feet of material is needed to make the fence.
Example 3

Find the surface area of the cylinder.
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Find the surface area of the cylinder.

8 in.

11 in.

466.5 \text{ in}^2
What is the total surface area of a cylinder with a height of 1 foot and a diameter of 2 feet? Round to the nearest tenth.
Homework Problems

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