Chapter 11: Surface Area & Volume

SECTION A: SURFACE AREA OF PRISMS & CYLINDERS

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I Can

- Apply the formula for the surface area of a prism
- Apply the formula for the surface area of a cylinder

Prisms

Prisms and cylinders have 2 congruent parallel bases.

A **lateral face** is not a base.

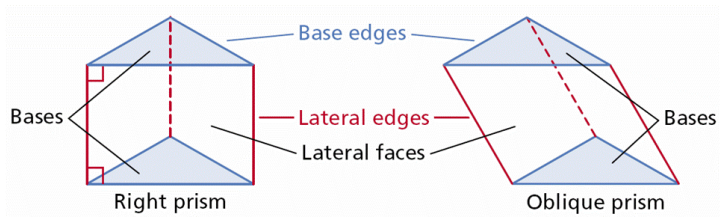
The edges of the base are called **base edges**.

A **lateral edge** is not an edge of a base.

The lateral faces of a **right prism** are all rectangles.

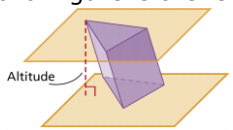
An **oblique prism** has at least one nonrectangular lateral face.

Prisms & Cylinders



Prisms & Cylinders

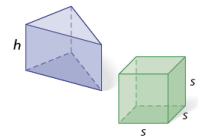
An **altitude** of a prism or cylinder is a perpendicular segment joining the planes of the bases. The *height* of a three-dimensional figure is the length of an altitude.



Surface area is the total area of all faces and curved surfaces of a three-dimensional figure.
The **lateral area** of a prism is the sum of the areas of the lateral faces.

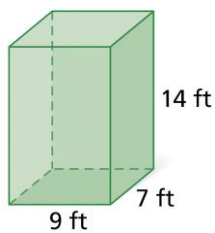
LA & SA of Right Prisms

Lateral Area and Surface Area of Right Prisms

The lateral area of a right prism with base perimeter P and height h is $L = Ph$.	
The surface area of a right prism with lateral area L and base area B is $S = L + 2B$, or $S = Ph + 2B$.	
The surface area of a cube with edge length s is $S = 6s^2$.	

Example

Find the lateral area and surface area of the right rectangular prism. Round to the nearest tenth, if necessary.



Example

Find the lateral area and surface area of a right regular triangular prism with height 20 cm and base edges of length 10 cm. Round to the nearest tenth, if necessary.

Cylinders

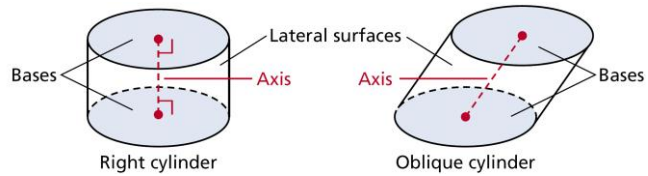
The **lateral surface** of a cylinder is the curved surface that connects the two bases.

The **axis of a cylinder** is the segment with endpoints at the centers of the bases.

The axis of a **right cylinder** is perpendicular to its bases.

The axis of an **oblique cylinder** is not perpendicular to its bases. The altitude of a right cylinder is the same length as the axis.

Cylinders

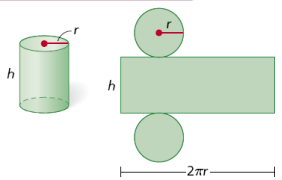


LA & SA of Cylinders

Lateral Area and Surface Area of Right Cylinders

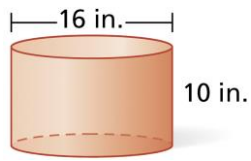
The lateral area of a right cylinder with radius r and height h is $L = 2\pi rh$.

The surface area of a right cylinder with lateral area L and base area B is $S = L + 2B$, or $S = 2\pi rh + 2\pi r^2$.



Example

Find the lateral area and surface area of the right cylinder. Give your answers in terms of π.

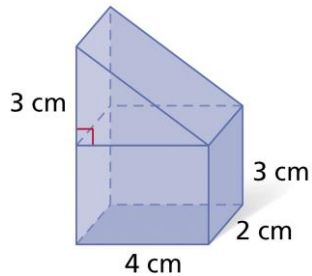


Example

Find the lateral area and surface area of a right cylinder with circumference 24π cm and a height equal to half the radius. Give your answers in terms of π.

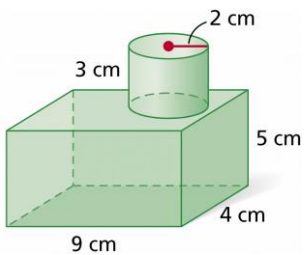
Composite Figures

Find the surface area of the composite figure.



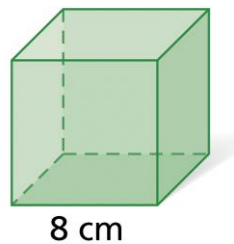
Composite Figures

Find the surface area of the composite figure. Round to the nearest tenth.



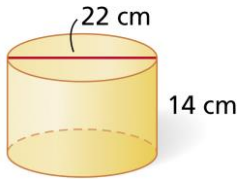
Effects of Changing Dimensions

The edge length of the cube is tripled. Describe the effect on the surface area.



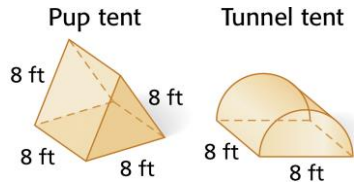
Effects of Changing Dimensions

The height and diameter of the cylinder are multiplied by 1/2. Describe the effect on the surface area.



Real World Example

A sporting goods company sells tents in two styles, shown below. The sides and floor of each tent are made of nylon. Which tent requires less nylon to manufacture?



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