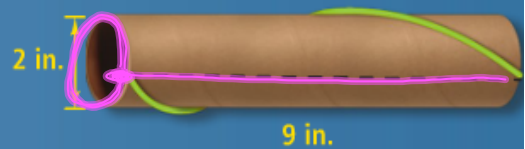


Geometry

Chapter 11

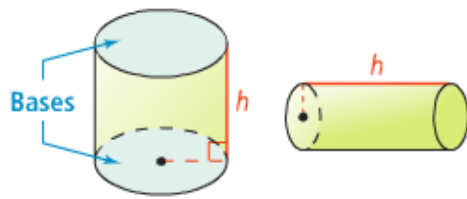
Section 11-2

A piece of string is wrapped once around an empty paper towel tube. The ends of the string are attached to each end of the tube as shown. How long is the piece of string? Justify your reasoning.

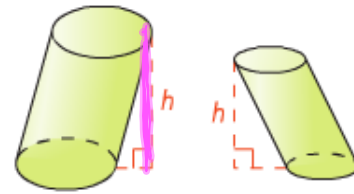


$$\begin{array}{l}
 \text{Handwritten diagram: A right triangle with a vertical leg of length } 2\pi r \text{ (circumference), a horizontal leg of length } 9 \text{ (length of tube), and a hypotenuse of length } x. \text{ Right angle symbols are shown at the corners.} \\
 x^2 = 9^2 + (2\pi)^2 \\
 x = \sqrt{81 + 4\pi^2}
 \end{array}$$

A **cylinder** is a solid that has two congruent parallel **bases** that are circles. An **altitude** of a cylinder is a perpendicular segment that joins the planes of the bases. The **height** h of a cylinder is the length of an altitude.



Right cylinders

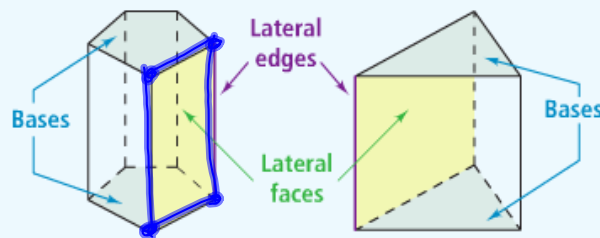


Oblique cylinders

****Note:**

Assume a right cylinder unless drawn or stated otherwise

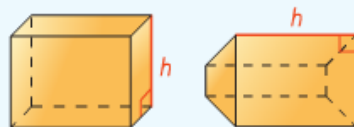
A **prism** is a polyhedron with two congruent, parallel faces, called **bases**. The other faces are **lateral faces**. You can name a prism using the shape of its bases.



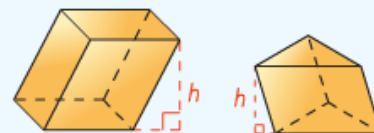
Pentagonal prism

Triangular prism

An **altitude** of a prism is a perpendicular segment that joins the planes of the bases. The **height** h of a prism is the length of an altitude. A prism may either be right or oblique.



Right prisms



Oblique prisms

****Note:** Assume a right prism unless drawn or stated otherwise

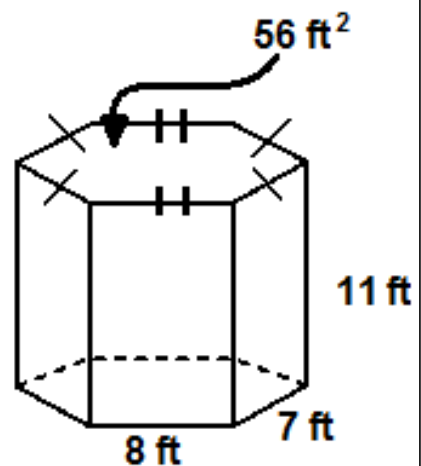
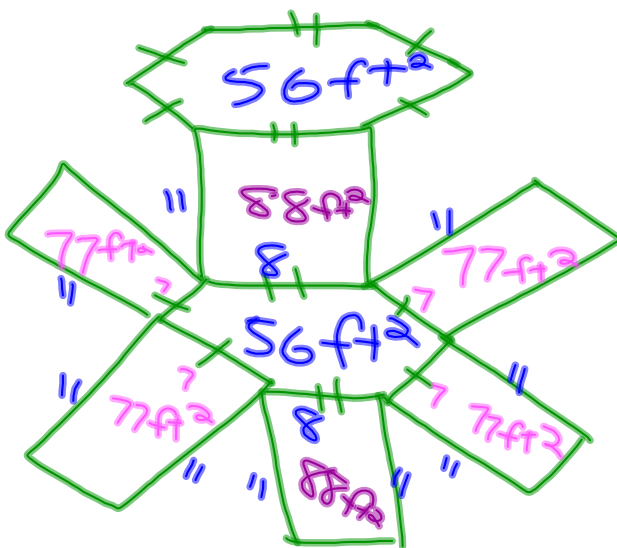
LA = Lateral Area

Area of the lateral surface
between parallel bases

SA = Surface Area

Area of the entire surface (lateral
and bases) of a 3D figure

Find the surface area of the right prism using a net diagram.



$$2(56) + 2(88) + 4(77) = 596 \text{ ft}^2$$

Take note

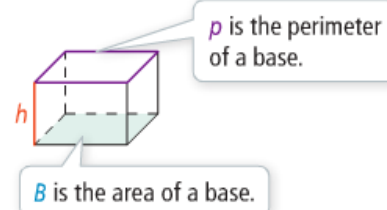
Theorem 11-1 Lateral and Surface Areas of a Prism

The lateral area of a right prism is the product of the perimeter of the base and the height of the prism.

$$\text{L.A.} = ph$$

The surface area of a right prism is the sum of the lateral area and the areas of the two bases.

$$\text{S.A.} = \text{L.A.} + 2B$$



Take note

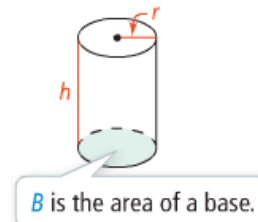
Theorem 11-2 Lateral and Surface Areas of a Cylinder

The lateral area of a right cylinder is the product of the circumference of the base and the height of the cylinder.

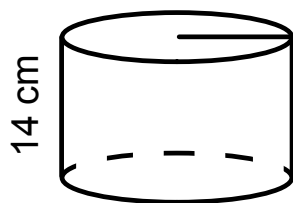
$$\text{L.A.} = 2\pi r \cdot h, \text{ or } \text{L.A.} = \pi dh$$

The surface area of a right cylinder is the sum of the lateral area and the areas of the two bases.

$$\text{S.A.} = \text{L.A.} + 2B, \text{ or } \text{S.A.} = 2\pi rh + 2\pi r^2$$



Find the lateral area of the figure.



10 cm

$$\text{L.A.} = 2\pi (10)(14)$$

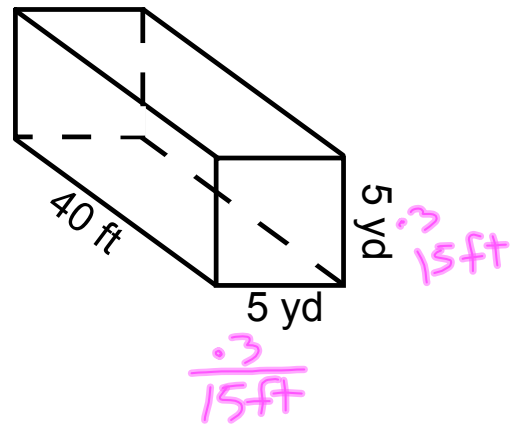
$$\text{L.A.} = 280\pi \text{ cm}^2$$

Find the lateral area of the figure between the square bases.

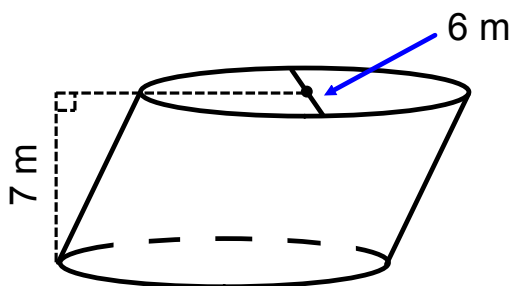
$$LA = 4(15) \cdot 40$$

$$LA = 60 \cdot 40$$

$$LA = 2400 \text{ ft}^2$$



Find the surface area of the figure.



$$SA = 2\pi(3)(7) + 2\pi(3)^2$$

$$SA = 42\pi + 18\pi$$

$$SA = 60\pi \text{ m}^2$$

Find the surface area of the figure.

$$SA = LA + 2B$$

$$LA = ph$$

$$= (24 + 26 + 26 + 36)(20)$$

$$= 112 \cdot 20$$

$$= 2240 \text{ in}^2$$

$$B = \frac{1}{2} h (b_1 + b_2)$$

$$= \frac{1}{2} (24)(26 + 36)$$

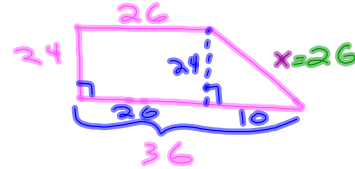
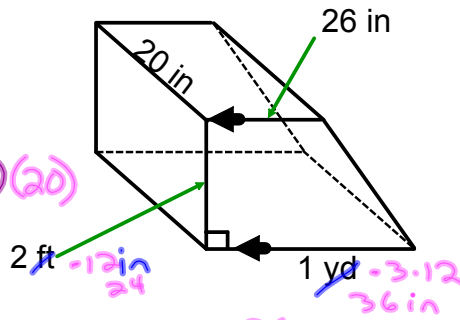
$$= 744 \text{ in}^2$$

$$SA = LA + 2B$$

$$= 2240 + 2(744)$$

$$= 2240 + 1488$$

$$= 3728 \text{ in}^2$$



$$b^2 + 24^2 = x^2$$

$$100 + 576 = x^2$$

$$\sqrt{676} = \sqrt{x^2}$$

$$26 = x$$

Homework

Pages 704 - 706

7 - 23 odd, 35 - 40 all