

12-4 Surface Areas of Cylinders

Cylinder:

* A 3-dimensional figure with the 2 bases as circles.

Axis:

* The segment with endpoints that are the center of the bases.

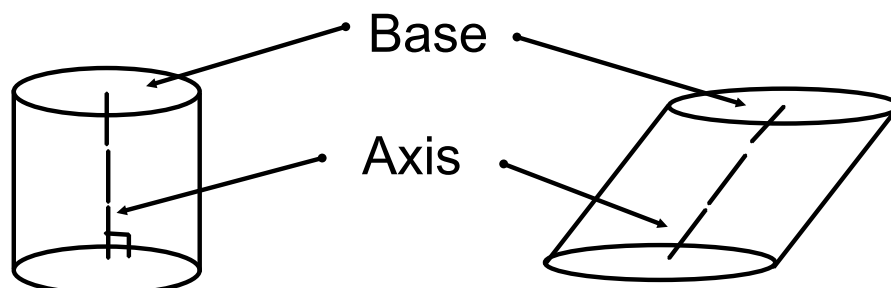
Right Cylinder:

* A cylinder that has the axis as the altitude.
(Forms a right angle.)



Oblique Cylinder:

* When there is a slant to the cylinder, the axis is not perpendicular to the bases.



Right
Cylinder

Oblique
Cylinder

Lateral Area:

* Think of it as the label on the soup can.

* Indicated by L.A. or L.

$$LA = ph$$

p = perimeter of base

h = height of cylinder

OR

$$LA = 2\pi rh$$

Surface Area:

* The area of the whole figure (lateral area and the bases).

* Indicated by S.A. or T (Total Area).

$$T = LA + 2B$$

B = Area of Base

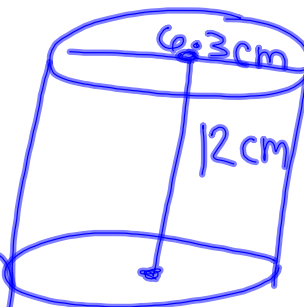
LA = Lateral Area

OR

$$SA = 2\pi rh + 2\pi r^2$$

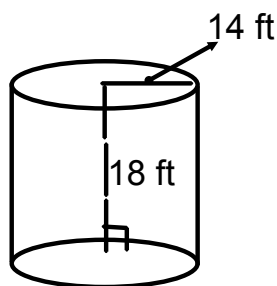
1. A fruit juice can is cylindrical with aluminum sides and bases. The can is 12 cm tall, and the diameter of the can is 6.3 cm. How many square centimeters of aluminum are used to make the sides of the can?

$$\begin{aligned}
 LA &= 2\pi rh \\
 &= 2\pi(3.15)(12) \\
 &= 2\pi(37.8) \\
 &= 237.5\text{cm}^2
 \end{aligned}$$



$$6.3 \div 2 = 3.15$$

2. Find the exact surface area of the cylinder.



π needs to be in the answer

$$SA = 2\pi rh + 2\pi r^2$$

$$SA = 2\pi(14)(18) + 2\pi(14)^2$$

$$S.A. = 504\pi + 392\pi$$

$$S.A. = 896\pi \text{ ft}^2$$

3. Find the radius of the base of a right cylinder if the surface area is 528π square feet and the height is 10 feet. S.A.

$$S.A. = 2\pi rh + 2\pi r^2 \quad h$$

$$528\pi = 2\pi r(10) + 2\pi r^2$$

$$528\pi = 20\pi r + 2\pi r^2$$

$$\frac{528\pi}{2\pi} = \frac{2\pi(10r + r^2)}{2\pi}$$

$$264 = r^2 + 10r$$

$$\frac{-264 \quad -264}{-264 \quad -264}$$

$$0 = r^2 + 10r - 264$$

$$0 = (r - 12)(r + 22)$$

$$r - 12 = 0 \quad r + 22 = 0$$

$$r = 12 \text{ ft} \quad r = -22$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$ax^2 + bx + c = 0$$