

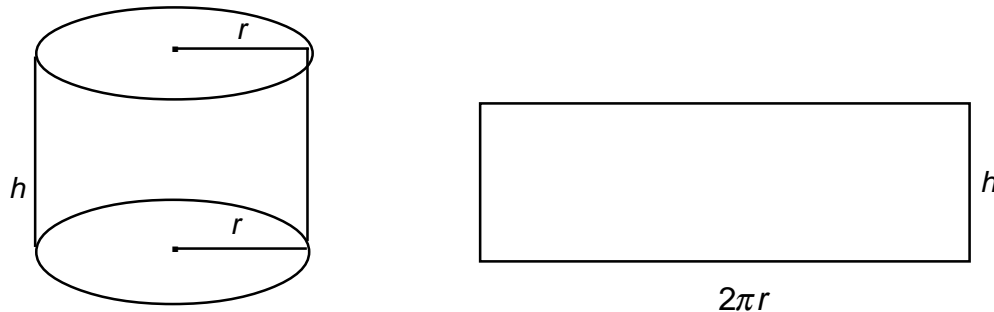


Math Study Strategies

Math for Air Conditioning and Refrigeration

Surface Areas of Cylinders and Cones

The surface area of a cylinder is the sum of the areas of the two bases and the area of the curved surface. In water heaters, the area of the curved surface is called the **lateral surface area**.



If you would cut the cylinder open and lay it flat, you would find that the lateral surface area is the area of a rectangle. This rectangle has a length equal to the circumference of the base of the cylinder. The height of the rectangle would be equal to the height of the cylinder.

The lateral surface area of a cylinder is:

$$LA = 2\pi rh$$

The area of each of the bases of the cylinder is:

$$A = \pi r^2$$

To find the total surface area (lateral surface area plus the area of the **two** bases) of a right circular cylinder, use the formula:

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

Some people wrap water heaters to keep in the heat. If a water heater is 1.5 feet in diameter and 5 feet tall, how much wrap is needed?

Diameter = 1.5 ft.
Radius = 0.75 ft.
height = 5 ft.

Lateral surface area (LA) $2 \times \pi \times 0.75 \times 5 = 23.56$ square ft.

Area of base $(A_B) = \pi (0.75)^2 = 0.56$

Total surface area (TA) $SA + 2(A_B) = 23.56 + 2(0.56) = 25.06$ square feet.