9.3 Surface Area of Cylinders

EQ: How can we find the surface area of a cylinder?

Formula: $S = \text{area of bases} + \text{area of lateral surface}$

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

Example 1:

$S = \text{area of bases} + \text{area of lateral surface}$

\[ S = 2\pi (4)^2 + 2\pi (4)(3) \]

\[ 2\pi 16 + 2\pi 12 \]

\[ 32\pi + 24\pi = 56\pi \]

\[ = 175.8 \text{ in}^2 \]

List:
- Top Circle: $\pi (4)^2 = 16\pi$
- Bottom Circle: $\pi (4)^2 = 16\pi$
- Rectangle: $2\pi (4) \times 3$
  \[ 8\pi \times 3 = 24\pi \]

\[ 16\pi + 16\pi + 24\pi = 56\pi \]

\[ = 175.8 \text{ in}^2 \]
Example 2: How much paper is used for the label of this can?

\[
\text{label} = \text{just the lateral surface} = \text{base} \times \text{height} \\
= 2\pi r \times h \\
= 2\pi (1) \times (2) \\
= 2\pi \times 2 \\
= 4\pi \\
= 12.56 \text{ in}^2
\]