

Chapter 2: Surface Area

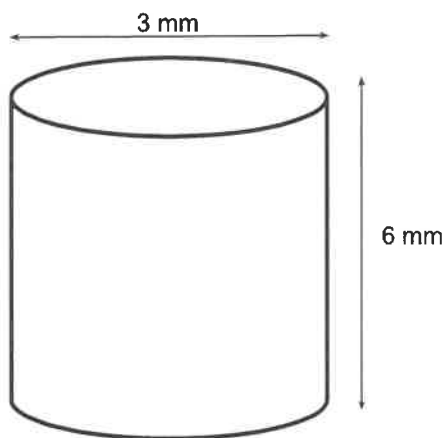
Section 2.4 - Surface area of Cylinders

Cylinder

- A 3D object with two **CONGRUENT** and **PARALLEL** circular bases

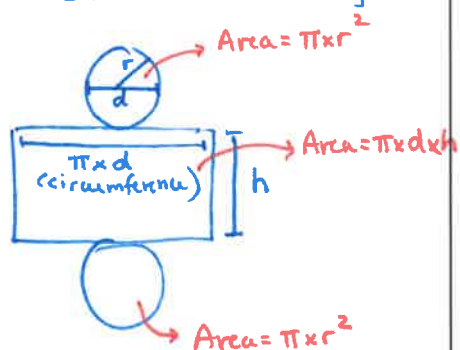
Notes

Examples



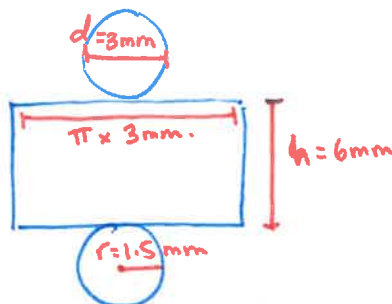
$$SA = 2(\pi \cdot r^2) + (\pi \cdot d \cdot h)$$

area of both circular ends. area of rectangular body



- Write down the info we know.
 diameter (d) = 3 mm.
 radius (r) = 1.5 mm * $\frac{1}{2}$ of diameter
 height (h) = 6 mm.

- Draw a net.



- Substitute values for r , d , and h into formula $\rightarrow$ calculate surface area.

$$\begin{aligned} SA &= 2(\pi \times r^2) + (\pi \times d \times h) \\ &= 2(\pi \times 1.5^2) + (\pi \times 3 \times 6) \\ &= 2(\pi \times 2.25) + (\pi \times 18) \end{aligned}$$

$$\begin{aligned} &= 2(2.25\pi) + 18\pi \\ &= 4.5\pi + 18\pi \end{aligned}$$

$$= 22.5\pi$$

$$= 22.5 \times \pi$$

$$= 70.69 \text{ mm}^2$$

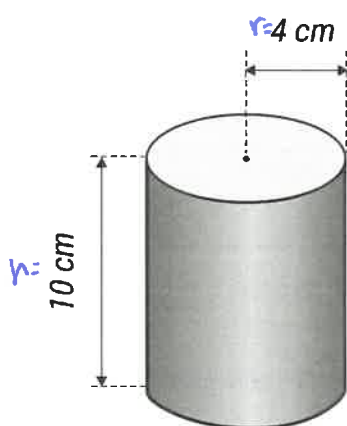
* rather than multiply by π (3.14...) we are going to "collect" or find how many total π 's we have.

22.5 groups of π

by waiting until the last step to multiply by $\pi \rightarrow$ we save rounding and makes it easier.

Notes

Examples

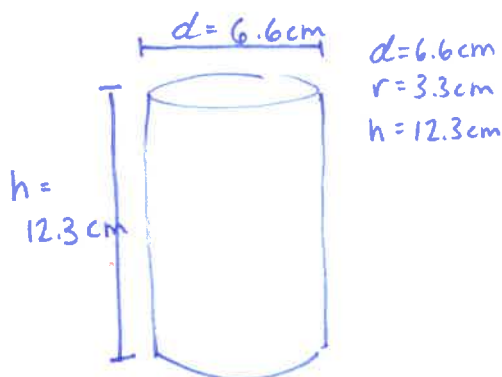


$$\begin{aligned} r &= 4 \text{ cm} \\ d &= 8 \text{ cm} \\ h &= 10 \text{ cm} \end{aligned}$$

$$\begin{aligned} SA &= 2(\pi \times r^2) + (\pi \times d \times h) \\ &= 2(\pi \times 4^2) + (\pi \times 8 \times 10) \\ &= 2(\pi \times 16) + (\pi \times 80) \\ &= 2(16\pi) + (80\pi) \\ &= 32\pi + 80\pi \\ &= 112\pi \\ &= 112 \times \pi \\ &= 351.86 \text{ cm}^2 \end{aligned}$$

Example - A pop can measures 12.3 cm tall and has a width of 6.6 cm. How much aluminum, in square centimeters, would it take to make one can?

→ Find SA → how much aluminum (cm^2) needed per can.



$$SA = 2(\pi \times r^2) + (\pi \times d \times h)$$

$$= 2(\pi \times 3.3^2) + (\pi \times 6.6 \times 12.3)$$

$$= 2(10.89\pi) + 81.18\pi$$

$$= 21.78\pi + 81.18\pi$$

$$= 102.96\pi$$

$$= 323.46 \text{ cm}^2 \text{ of aluminum needed.}$$

Practice assignment: page 62 # 1-4, 7, 8 (challenge: #10)