

3.2B Volume of a Prism

Recall from 3.2A:

$$\text{Volume} = \text{Base Area} \times \text{height}$$

Often we will have to calculate the base area ourselves.

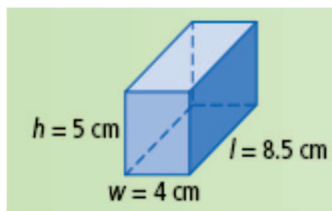
Area of a rectangle: $A = lw$

Area of a triangle: $A = \frac{bh}{2}$

Area of a circle: $A = \pi r^2$

Example 1: Volume of a Rectangular Prism

Determine the volume of each rectangular prism.

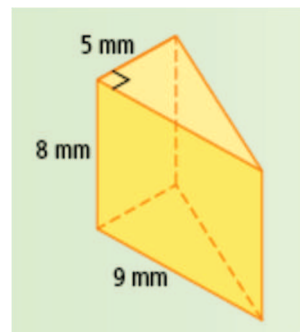


$$\begin{aligned} A_{\text{base}} &= 4(8.5) \\ &= 34 \text{ cm}^2 \\ V &= 34(5) \\ &= 170 \text{ cm}^3 \\ \hline V &= 4(8.5)(5) = 170 \text{ cm}^3 \end{aligned}$$

$$V = lwh$$

Example 2: Volume of a Triangular Prism

Determine the volume of each triangular prism.

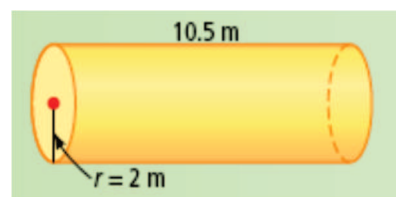


$$\begin{aligned} A_{\text{base}} &= \frac{9(5)}{2} \\ &= 22.5 \text{ mm}^2 \\ V &= 22.5(8) \\ &= 180 \text{ mm}^3 \\ \hline V &= \frac{9(5)}{2} \cdot 8 = 180 \text{ mm}^3 \end{aligned}$$

$$V = \frac{l_{\text{tri}} h}{2}$$

Example 3: Volume of a Cylinder

Determine the volume of each cylinder. (Round to nearest tenth)



$$\begin{aligned} A_{\text{base}} &= 3.14(2)^2 \\ &= 12.56 \text{ m}^2 \\ V &= 12.56(10.5) \\ &= 131.88 \\ &= 131.9 \text{ m}^3 \\ \hline V &= 3.14(2)^2(10.5) = 131.9 \text{ m}^3 \end{aligned}$$

$$V = \pi r^2 h$$

Example 4 Solving a Problem Involving Volume

If a new box of Oat Crunchies is completely full what is the volume of the cereal inside the box?

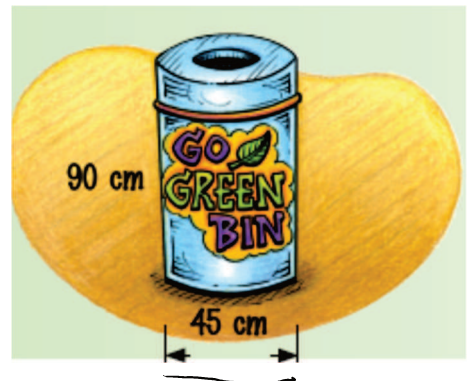
$$\begin{aligned} V &= 30(18)(8) \\ &= 4320 \text{ cm}^3 \end{aligned}$$



Example 5 Solving a Problem Involving Volume

What volume of recyclable waste will fit into one of these bins?

$$\begin{aligned} V &= 3.14(22.5)^2(90) \\ &= 143066.25 \text{ cm}^3 \end{aligned}$$



$$\begin{aligned} r &= 45/2 \\ &= 22.5 \end{aligned}$$