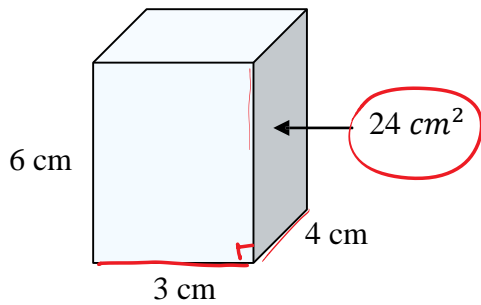


Date: _____

7.2: Volume of a Prism



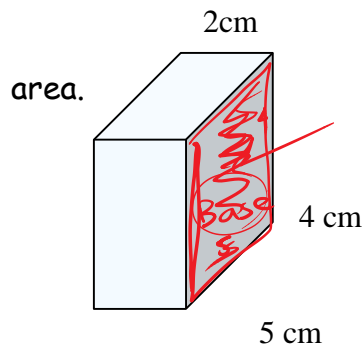
Jodi found the volume of the rectangular prism shown. What were her calculations?

$$\begin{aligned}V &= \text{area of base} \times \text{height} \\ &= 24\text{cm}^2 \times 3\text{cm} \\ &= 72\text{cm}^3\end{aligned}$$

Jodi had to calculate the area of the base. What were her steps?

$$\begin{aligned}\text{Area of Base} &= \text{length} \times \text{width} \\ 24\text{cm}^2 &= 4\text{cm} \times 6\text{cm}\end{aligned}$$

You can find the volume of a rectangular prism if you know length, width and height.



Choose one side to be the base. Find its area.

Picked side to be our base.

$$\begin{aligned}A &= l \times w \\ &= 5\text{cm} \times 4\text{cm} \\ &= 20\text{cm}^2\end{aligned}$$

Find the volume of this rectangular prism.

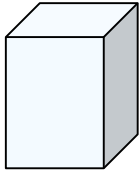
$$\begin{aligned}V &= \text{area of base} \times h \\ &= 20\text{cm}^2 \times 2\text{cm} \\ &= 40\text{cm}^3\end{aligned}$$

The volume can also be found with one step:

$$\begin{aligned}V &= (\text{length} \times \text{width}) \times \text{height} \\ &= (5\text{cm} \times 4\text{cm}) \times 2\text{cm} \\ &= 40\text{cm}^3\end{aligned}$$

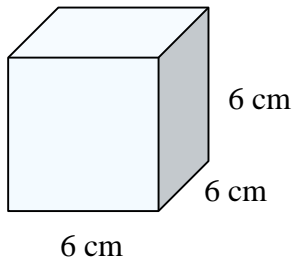
Summary:

for rectangular prism



$$V = l \times w \times h$$

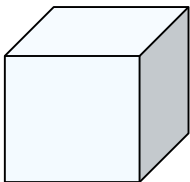
What happens if all the sides of a rectangular prism are the same?



$$\begin{aligned} V &= l \times w \times h \\ &= 6 \times 6 \times 6 \\ &= 6^3 \\ &= 216 \text{ cm}^3 \end{aligned}$$

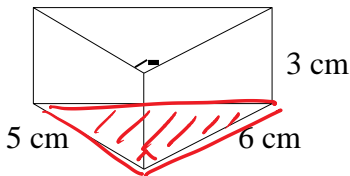
Summary:

For cubes



$$\begin{aligned} V &= \text{Side}^3 \\ &= s^3 \end{aligned}$$

How does the volume of a triangular prism compare to a rectangular prism?

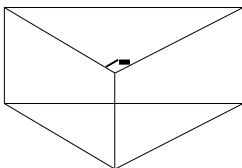


Find the volume of the triangular prism shown.

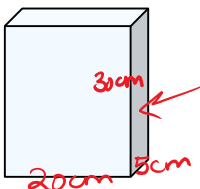
$$\begin{aligned} V &= \text{area of base} \times \text{height} \\ &= \left(\frac{b \times h}{2} \right) \times \text{height} \\ &= (5 \times 6 \div 2) \times 3 \\ &= (30 \div 2) \times 3 \\ &= 15 \times 3 = 45 \text{ cm}^3 \end{aligned}$$

Summary:

For triangular prisms:



$$V = \left(\frac{l \times w}{2} \right) \times h$$



Fried Banana Breakfast cereal comes in boxes that measure 20cm wide, 30cm tall, and 5cm thick. If they only come seven-eighths full, what volume of cereal does one box contain?

$$\begin{aligned} \text{step 1: } V &= l \times w \times h \\ &= 30 \times 5 \times 20 \\ &= 3000 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{step 2: } & \frac{7}{8} \text{ of Box Volume} \\ & \frac{7}{8} \times 3000 \text{ cm}^3 \end{aligned}$$

$$= (7 \div 8) \times 3000 = 2625 \text{ cm}^3$$

Volume of cereal