

Convert 15.7 millimeters to centimeters.

$$\begin{array}{c} \text{mm} \longrightarrow \text{m} \longrightarrow \text{cm} \\ \hline 15.7 \text{ mm} \left( \frac{1 \times 10^3 \text{ m}}{1 \text{ mm}} \right) \left( \frac{1 \text{ cm}}{1 \times 10^{-2} \text{ m}} \right) \\ \hline = 1.57 \text{ cm} \quad (\text{calculator}) \end{array}$$

By hand:

$$15.7 \times \frac{10^{-3}}{10^{-2}} \rightarrow 10^{-3} - (-2) \\ = 10^{-3+2} \\ = 10^{-1}$$

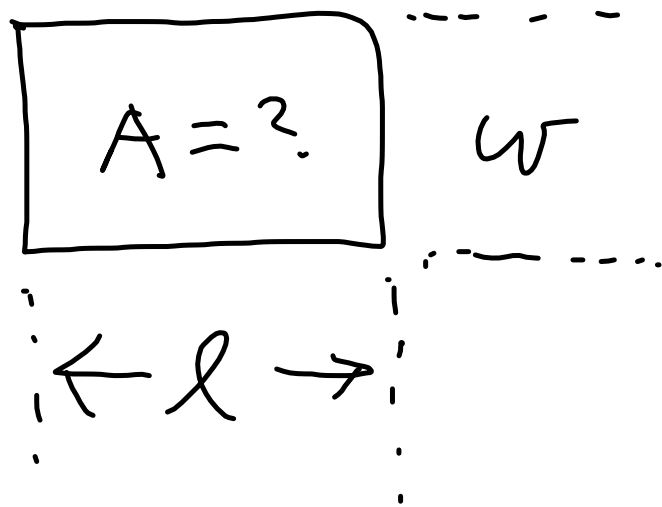
$$\begin{array}{l} 15.7 \times 10^{-1} \rightarrow 1.57 \times 10^0 \\ \rightarrow 1.57 \times 1 \\ \rightarrow 1.57 \end{array}$$

## Rules for Powers of 10

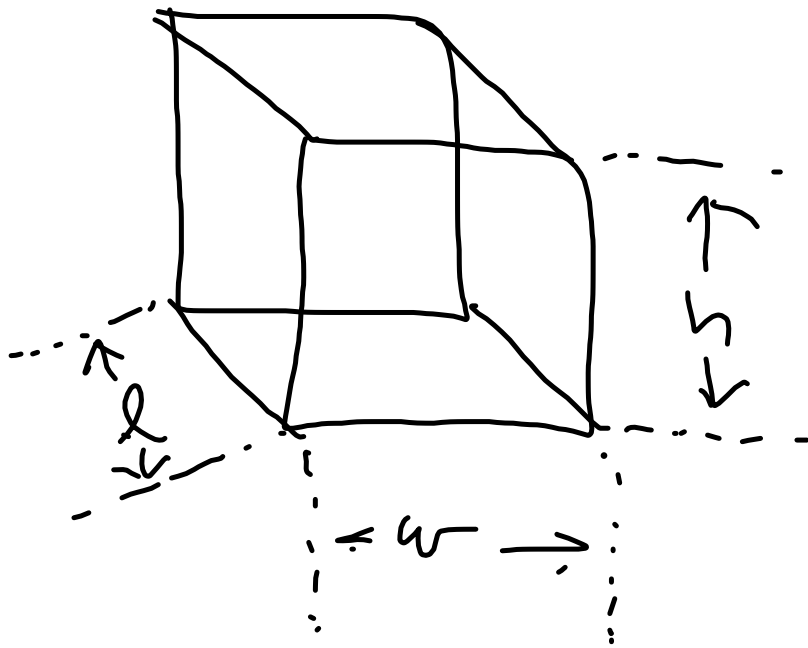
$$10^x \cdot 10^y = 10^{x+y}$$

$$\frac{10^x}{10^y} = 10^{x-y}$$

$$(10^x)^y = 10^{x \cdot y}$$



$$A = l \cdot w$$



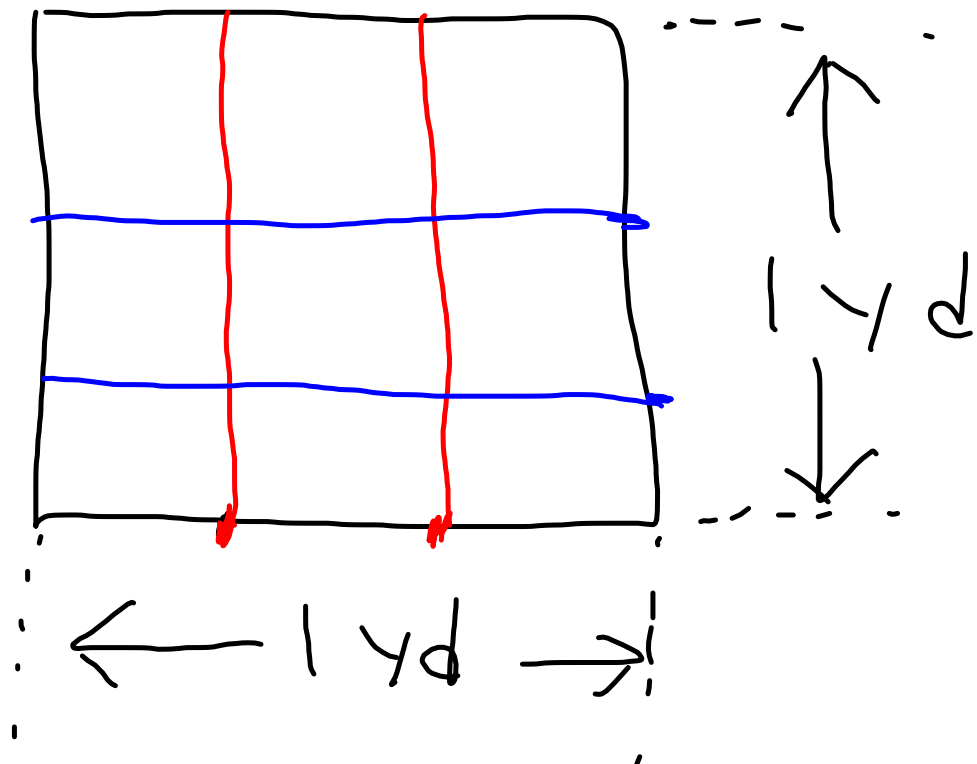
$$V = l \cdot w \cdot h$$

$$1 \text{ yd} = 3 \text{ ft}$$

Convert 81 square feet  
to square yards.

$$\begin{array}{r} \text{ft}^2 \\ \hline 81 \text{ ft}^2 \\ \hline 1 \end{array} \longrightarrow \text{yd}^2 \left( \frac{1 \text{ yd}^2}{9 \text{ ft}^2} \right) = 9 \text{ yd}^2$$

$$1 \text{ yd}^2 = 9 \text{ ft}^2$$



Convert 0.118 cubic kilometers into cubic centimeters.

$$\begin{aligned}
 & \text{km}^3 \longrightarrow \text{m}^3 \longrightarrow \text{cm}^3 \\
 & \frac{0.118 \text{ km}^3}{1} \left( \frac{1 \times 10^3 \text{ m}}{1 \text{ km}} \right)^3 \left( \frac{1 \text{ cm}}{1 \times 10^{-2} \text{ m}} \right)^3 = \\
 & \frac{0.118 \text{ km}^3}{1} \left( \frac{1 \times 10^9 \text{ m}^3}{1 \text{ km}^3} \right) \left( \frac{1 \text{ cm}^3}{1 \times 10^{-6} \text{ m}^3} \right) \\
 & = 0.118 \times \left( \frac{10^9}{10^{-6}} \right) \longrightarrow 10^9 - (-6) \\
 & \quad \downarrow \qquad \qquad \qquad \downarrow \\
 & 0.118 \times 10^{15} \qquad \qquad \qquad 10^9 + 6 \\
 & \quad \downarrow \qquad \qquad \qquad \downarrow \\
 & 1.18 \times 10^{14} \text{ cm}^3 \qquad \qquad \qquad 10^{15}
 \end{aligned}$$

$$1 \text{ liter} = 1 \text{ dm}^3$$

$$1 \text{ mL} = 1 \text{ cm}^3 = 1 \text{ c.c.}$$

$$1 \text{ }\mu\text{L} = 1 \text{ mm}^3$$

$$1 \text{ kL} = 1 \text{ m}^3$$

$$1 \text{ gal} = 231 \text{ in}^3$$