Chapter 2

• Solved Problems from Lecture
Learning Check

• If a ski pole is 3.0 feet in length, how long is the ski pole in mm?

\[ \text{?mm} = 3.0 \text{ft} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{1 \text{ m}}{39.37 \text{ in}} \times \frac{1000 \text{ mm}}{1 \text{ m}} = 914.4 \text{ mm} \]

\[ \sqrt{9.1 \times 10^2 \text{ mm}} \]
Learning Check

• If a bucket contains 4.65L of water. How many gallons of water is this?

(1 gallon = 4qts, 1L = 1.057qt)

\[
?\text{gal} = 4.65\text{L} \times \frac{1.057\text{qts}}{1\text{L}} \times \frac{1\text{gal}}{4\text{qts}} = 1.2287\text{gal}
\]

1.23 gal
Dimensional Analysis

If Jules Vern expressed the title of his famous book, “Twenty Thousand Leagues Under the Sea” in feet, what would the title be?

\[
? \text{ ft} = 20000 \text{ leagues} \times \frac{3.450 \text{ miles}}{1 \text{ league}} \times \frac{5280 \text{ ft}}{1 \text{ mile}} = 364320000 \text{ ft} \]

\[
4 \times 10^8 \text{ ft} \]

“4 hundred million feet”
Learning Check

A rattlesnake is 2.44 m long. How many centimeters long is the snake?

\[ ? \text{ cm} = 2.44 \text{ m} \times \frac{100 \text{ cm}}{1 \text{ m}} = 244 \text{ cm} \]
Learning Check

If a particular fad diet claims a weight loss of 3.0 pounds per week, how many grams per day would this be? \(1 \text{lb} = 453.6 \text{g}\)

\[
\frac{? \text{ g}}{\text{day}} = \frac{3.0 \text{ lbs}}{1 \text{ week}} \times \frac{453.6 \text{ g}}{1 \text{ lb}} \times \frac{1 \text{ week}}{7 \text{ days}} = \frac{194.4 \text{ g}}{\text{day}}
\]

\[
\frac{2}{1.9 \times 10^9 \text{ g}}
\]
Displacement volume for a stock engine is specified at 350. in\(^3\). What is the displacement in L?

\[\text{?L} = 350 \text{ in}^3 = 350 \text{ in}^3 \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{1 \text{ ml}}{1 \text{ cm}^3} \times \frac{1 \text{ L}}{1000 \text{ ml}} = 5.735 \text{ L}\]

\[5.74 \text{ L}\]