Chapter 1 Practice Problems

Problems found in lecture slides and textbook

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1.1 The Scope and Scale of Physics

1.2 Units and Standards

1.3 Unit Conversion

Example 3.1. A solid sphere has a surface area of $7.29 \times 10^{-2}\,\mathrm{m}^2$.

(a) What is the radius of the sphere?

(b) What is the volume of the sphere?

(c) If the sphere has a mass of $2.30 \times 10^{-3}\,\mathrm{kg}$, what is the volume density of the sphere?

(d) If the sphere was instead a hollow one, what would be the area density of the sphere?

Problem 1a. Using the formula for surface area of a sphere $sa = 4\pi r^2$, we can rearrange the equation for r

$$r = \sqrt{\frac{sa}{4\pi}}.$$

This gives

$$\begin{aligned} r &= \sqrt{\frac{0.0729}{4\pi}} \\ &= 0.0762. \end{aligned}$$

Note: Since the number of significant figures in the result should match the number of significant figures in the least precise measurement used in the calculation, our result should be reported with three significant figures.

1.4 Dimensional Analysis

1.5 Estimates and Fermi Calculations

1.6 Significant Figures