

Dimensional Analysis - Practice Problems

1. How many cm are in 1 km? How many km are in 1 cm?

2. Convert 100 mL to gallons, given:

$$1 \text{ fl. oz.} = 29.57 \text{ mL}$$

$$1 \text{ cup} = 8 \text{ fl. oz.}$$

$$1 \text{ pint} = 2 \text{ cups}$$

$$1 \text{ quart} = 2 \text{ pints}$$

$$1 \text{ gallon} = 4 \text{ quarts}$$

3. The mass of a proton is 1.67263×10^{-24} g, and the mass of an electron is 9.10939×10^{-28} g. A molecule of H_2 has two protons and two electrons. Find its mass.

4. In 2009, Usain Bolt ran the 100m dash in 9.58s. Find his average velocity in miles/hour. (You may find it useful to know that 1m = 39.37 inches, 1 foot = 12 inches, and 1 mile = 5,280 feet.)

5. (a) Convert 3.2×10^7 m to cm.

(b) Convert 3.2×10^7 m³ to cm³.

6. The speed of light, c , is approximately 2.9979×10^8 m/s. The distance from the sun to the earth is approximately 1.511×10^8 km. How many seconds does it take for light to travel from the sun to the earth?