

CHEM 0094 MEASUREMENT PROBLEM SET

- Give the number of significant figures in:
(a) 13.27 g (b) 0.00347 L (c) 4.2040 cm (d) 280.0 km
- Round off the following to three significant figures:
(a) 3883 (b) 6.4080 (c) 89.98 (d) 40.006 (e) 0.0023456
- Express the following numbers in scientific notation:
(a) 6548976 (b) 0.00000342 (c) 3456.986
- Give the answers to the correct number of significant figures:
(a) $\frac{4.68 \times 456}{0.078} =$ (b) $67.5 + 1.43 - 0.5247 =$
(c) $(2.634 \times 10^2) + (234 \times 10^{-1}) =$
(d) $\frac{6.98 \times 10^6 \times 3.453 \times 10^{-4}}{4.32 \times 10^{-8} \times 1.663 \times 10^5} =$
- Do the following conversions:
(a) 67 mg to g (b) 753 km to cm (c) 3.45×10^{-3} mm to m
(d) 23 m^3 to cm^3 (e) 345 mm^2 to km^2
- According to the Sporting News, the fastest recorded speed at which a baseball was thrown is 100.8 miles per hour. Calculate the speed in meters per second. 1 mile = 1.61 km.
- Aluminum has a density of 2.70 g/cm^3 . Convert this to lb/ft^3 using $454 \text{ g} = 1 \text{ lb}$ and $2.54 \text{ cm} = 1 \text{ inch}$.
- The density of gasoline at 20°C is 0.67 g/mL . What is the volume of 23.5 g of gasoline at this temperature?
- The density of corn oil is 0.90 g/mL . What is the mass of 65.8 mL of corn oil?
- The density of bromine is to be calculated from the following experiment. A volumetric flask of capacity 50.0 mL and mass 27.6578 g was filled to the mark with bromine and reweighed. The mass of the filled flask was 174.0592 g.
- A container weighs 68.31 g empty, 93.34 g filled with water (density = 0.9980 g/mL), and 88.42 g filled with an unknown liquid. Calculate the density of the unknown liquid.
- In the movie Raiders of the Lost Ark, Indiana Jones and an unscrupulous guide play catch with a gold idol. Assuming that the idol was solid gold and 1.00 L in size, what was the mass of the idol? Is playing catch with it plausible? (Density of gold = 19.32 g/cm^3)
- Do the following temperature conversions:
(a) 365°F to $^\circ\text{C}$ (b) 87°C to $^\circ\text{F}$ (c) 14°F to $^\circ\text{C}$ (d) -28°C to $^\circ\text{F}$
(e) 29°C to K (f) 313 K to $^\circ\text{F}$

20. A calorimeter contains 72.0 g of water at 19.2°C. A 141 g piece of tin is heated to 89.0°C and dropped into the water. The entire system eventually reaches 25.5°C. Assuming all of the heat gained by the water comes from the cooling of the tin - no heat loss to the calorimeter or surroundings - calculate the specific heat of the tin.