

1. State the number of significant figures in each of the following numbers.

a. 6.4157 m _____

b. 4.57700×10^{-5} s _____

c. 0.0003445 g _____

d. 0.0122 km _____

e. 15 books _____

2. Perform the following calculations (work in this problem need not be shown). **Give your answer with the correct number of significant figures.**

a. $(14.5 \times 123) - 2.20 \times 10^1$ _____

b. $(55.6 - 22.5) \times (12.3 \div 0.56)$ _____

c. $1201 + 1.3 \times 10^3 + 1 \times 10^2$ _____

d. $\frac{4(15.6)^3(3.1415)}{3}$ (4 and 3 are exact) _____

e. $2.334 \times 10^4 \div 5.668 \times 10^3$ _____

3. Convert the following. **SHOW ALL WORK FOR FULL CREDIT.** (Conversion factors are on the last page.)

a. The volume of the Houston Astrodome is $8.235 \times 10^8 \text{ ft}^3$. What is this volume in L?

b. The temperature on the moon in daylight is about $265 \text{ }^\circ\text{F}$. What is this temperature in K?

c. The average sedan has a fuel capacity of 17 gal. What is the volume in mL?

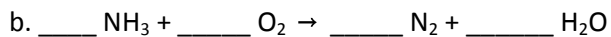
d. A NASCAR race car travels around the track at 132.9 kilometers per hour. What is this speed in feet per second?

4. What is the density of a substance (in g/mL) if it has a mass of 1.367 lb. and a volume of 3.2 gal?

5. A sample of a compound containing only C, H, and S was burned in oxygen, and 6.60 g of CO₂, 5.41 g of H₂O, and 9.61 g of SO₂ were obtained. What is the empirical formula of the compound?

6. Calculate the **mass of water produced** when 25.00 g of liquid butanol (C₃H₇OH) reacts with 70.00 g of oxygen gas. The products are gaseous carbon dioxide and liquid water. Include phase labels in your balanced chemical equation.

7. **Balance** the following chemical equations:



8. 24.55 g of Barium Nitrate reacts with Cesium Phosphate to produce Cesium Nitrate and solid Barium Phosphate. Calculate the **mass of Barium Phosphate** produced if there is an 87.66 % yield.

9. Calculate the following:

a. The number of oxygen atoms in 100.00 g of Iron(III) Oxalate.

b. Calculate the **number of atoms** in a cube of Aluminum that has an edge length of 5.00 cm and a density of 2.70 g mL^{-1} . Volume of a cube = (edge length)³

Conversion Factors

$$1 \text{ qt} = 0.9463 \text{ L}$$

$$1.609 \text{ km} = 1 \text{ mi}$$

$$2 \text{ c} = 1 \text{ pt}$$

$$1 \text{ lb.} = 453.6 \text{ g}$$

$$2 \text{ pt} = 1 \text{ qt}$$

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

$$1 \text{ mi} = 5280 \text{ feet}$$

$$1 \text{ gal} = 4 \text{ qt}$$

$$8 \text{ furlongs} = 1 \text{ mi}$$