KEY

Chapter 2 and 3 Exercise

1. Express each of the following products in exponential form:
   a. 3 x 3 x 3 = 3^3 b. 2 x 2 x 2 x 2 = 2^4
   b. 1/8 x 1/8 = 8^{-2} c. ¼ x ¼ x ¼ x ¼ x ¼ x ¼ x ¼ = 4^{-7}

2. Express each of the following products as a power of 10:
   a. 10 x 10 x 10 x 10 x 10 x 10 = 10^6 b. 1/10 x 1/10 x 1/10 x 1/10 = 10^{-4}

3. Express the following ordinary numbers in scientific notation to 2 significant figures:
   a. 368.78 g = 3.7×10^2 g
   b. 80.000 mL = 8.0×10^1 mL
   c. 7009.4 mm = 7.0×10^3 mm
   d. 0.000005355 cm = 5.4×10^{-6} cm
   e. 0.095009 dg = 9.5×10^{-2} dg
   f. 0.0004967000 km = 5.0×10^{-4} km

4. Write two unit equations for each of the following:
   a. 1 mile = 1.61 km (1 mi/ 1.61 km) or (1.61 km/ 1 mi)
   b. 1 kg = 2.20 lbs

5. Solve the following problems using unit analysis:
   a. How many cups of orange juice are in 6.7 pints? (1 pint = 2 cups) = 13.4 cups
   b. How many inches are in 219.6 cm? (1 inch = 2.54 cm) = 86.46 in
   c. How many months are in 0.36 years? = 4.3 months
   d. How many seconds are there 42 hours? = 1.5×10^5 sec
   e. How many meters are there in 821 mm? = 0.821 m
   f. How many centiliters are there in 48.9 ml? = 4.89 cL

6. Solve the following percent problems:
   a. If a chemistry class has 55 students enrolled and only 42 students show-up to class on the first day, what percentage of students are dropped for not showing up? 55-42 = 13 no-shows = (13/55) x 100 % = 24 % dropped
   b. A man has a rare coin collection that includes 35 pennies, 25 dimes, 12 nickles, and 15 silver dollars, what percentage of his collection are silver dollars? 87 total coins = (15/87) x 100 % = 17 % silver dollars
   c. A 3.927 g sample of brass contains 2.33 g of copper. What percent of copper is in the brass? (2.33 g/3.927 g) x 100 % = 59.3 % copper
   d. The Earth's crust has a mass of 2.37×10^{23} g and contains 49.2% oxygen, 25.7% silicon, and 7.50% aluminum. Calculate the mass of each element in the crust. oxygen = 1.17×10^{23} g, Si = 6.09×10^{22} g, Al = 1.78×10^{22} g