Chemistry 101-Unit 2
Answers to Practice Problems

For each of the following, identify the coefficient, exponential, base and exponent:

NUMBER	coefficient	exponential	base	exponent
5.91×10^{5}	**5.91**	**10^{5}**	**10**	**5**
* 210×10^{-8}	**210**	**10^{-8}**	**10**	**-8**
** 0.061×10^{-3}	**0.061**	**10^{-3}**	**10**	**-3**
4.88×10^{-6}	**4.88**	**10^{-6}**	**10**	**-6**
3.83×10^{9}	**3.83**	**10^{9}**	**10**	**9**
6.023×10^{23}	**6.023**	**10^{23}**	**10**	**23**
4.18×10^{0}	**4.18**	**10^{0}**	**10**	**0**

Which of the above are not in scientific notation? *** 210 x 10^{-8}; ** 0 .061 x 10^{-3}**
Re-write them in scientific notation. *** 2.10 x 10^{-6} ** 6.1 x 10^{-5}**

Write the following in scientific notation:

570,000 = **5.7 x 10^{5}** 4,820 = **4.82 x 10^{3}**

0.00699 = **6.99 x 10^{-3}** 0.000000311 = **3.11 x 10^{-7}**

958×10^{4} = **9.58 x 10^{6}** 0.0744×10^{-3} = **7.44 x 10^{-5}**

Write the following in ordinary decimal notation:

6.18×10^{4} = **61,800** 225×10^{-1} = **22.5**

3.86×10^{-5} = **0.0000386** 158×10^{2} = **15,800**

3.99×10^{-2} = **0.0399** 1.64×10^{0} = **1.64**

Solve the following, with correct units.
Which cannot be calculated as written? **(#4, #8)**

1. 15.3×10^{-7} m + 9.7×10^{-7} m = **2.5×10^{-6} m or 25×10^{-7} m**

2. (4.86×10^{10} mm) x (7.20×10^{6} mm) = **3.50×10^{17} mm^2**

3. (6.49×10^{-3} cm^3) / (1.56×10^{-4} cm^2) = **4.16×10^{1} cm**

* 4. 2.33×10^{4} L + 6.18×10^{3} L = **2.948×10^{4} L**

5. (15.9×10^{-3} g) / (4.47×10^{-3} mL) = **3.557×10^{0} g/mL**

6. 2.14×10^{1} g/mL) x (5.0×10^{1} mL) = **1.07×10^{3} g**

7. 5.22×10^{-3} g - 2.18×10^{-3} g = **3.04×10^{-3} g**

* 8. 9.78×10^{4} km - 6.91×10^{2} km = **9.7109×10^{4} km**

*** Cannot be calculated as written since the exponents don't match! Your calculator automatically corrects this.**

9. The distance from the earth to the sun is 1.5×10^{8} kilometers. Calculate the number of millimeters.

$$1.5 \times 10^{8}\ \text{km} \times \frac{1000\ \text{m}}{1\ \text{km}} \times \frac{1000\ \text{mm}}{1\ \text{m}} = 1.5 \times 10^{14}\ \text{mm}$$

10. Calculate the number of grams in 19.4×10^{-4} kilograms.

$$19.4 \times 10^{-4}\ \text{kg} \times \frac{1000\ \text{g}}{1\ \text{kg}} = 1.94\ \text{g}$$

11. Calculate the number of milliliters of water in a pool that contains 5.0×10^{7} liters.

$$5.0 \times 10^{7}\ \text{L} \times \frac{1000\ \text{mL}}{1\ \text{L}} = 5.0 \times 10^{10}\ \text{mL}$$

12. Calculate the number of ounces in 1.6×10^{4} tons of coal.

$$1.6 \times 10^{4}\ \text{tons} \times \frac{2000\ \text{lbs}}{1\ \text{ton}} \times \frac{16\ \text{oz}}{1\ \text{lb}} = 5.12 \times 10^{8}\ \text{oz}$$

13. Determine the number of centimeters in 8.6×10^{-9} km.

$$8.6 \times 10^{-9}\ \text{km} \times \frac{1000\ \text{m}}{1\ \text{km}} \times \frac{100\ \text{cm}}{1\ \text{m}} = 8.6 \times 10^{-4}\ \text{cm}$$

14. The human eye is most sensitive to light having a wavelength of 5.55×10^{-9} meters. What is this wavelength in millimeters?

$$\mathbf{5.55 \times 10^{-9}\ m \times \frac{1000\ mm}{1\ m} = 5.55 \times 10^{-6}\ mm}$$

15. An experiment requires 3.59×10^{-2} kg of a chemical. What is this mass in mg?

$$\mathbf{3.59 \times 10^{-2}\ kg \times \frac{1000\ g}{1\ kg} \times \frac{1000\ mg}{1\ g} = 3.59 \times 10^{4}\ mg}$$

16. In a water molecule (H_2O) the distance between a hydrogen atom and the oxygen atom is 9.6×10^{-11} m. What is the distance in cm?

$$\mathbf{9.6 \times 10^{-11}\ m \times \frac{100\ cm}{1\ m} = 9.6 \times 10^{-9}\ cm}$$