EXPONENTIAL (SCIENTIFIC) NOTATION

In chemistry we deal with very small and very large numbers. It is awkward to use many zeros to express very large or very small numbers, so scientific notation is used. The number is rewritten as the product of a number between 1 and 10 and an exponential term—10^n, where n is a whole number.

The power of 10 is determined by starting with the original number, the number being converted to scientific notation. Count the number of places that the decimal point must be moved in order to have only one non-zero digit to the left of the decimal point. For each place the decimal point is moved left, the power of 10 is increased by 1. For each place the decimal point is moved right, the power of ten is decreased by 1.

Examples:

1) Express 350,000 in exponential (scientific) notation
$350{,}000 = 3.5 \times 10^5$

2) Express 0.000000587 in exponential notation
$0.000000587 = 5.87 \times 10^{-7}$

3) Write the number 6.02×10^{23} in standard form
$6.02 \times 10^{23} = 602{,}000{,}000{,}000{,}000{,}000{,}000{,}000$

4) The distance between New York City and San Francisco is 4,741,000 meters:
$4{,}741{,}000 \text{ m} = 4.741 \times 10^6 \text{ m}$

5) The amount of ranitidine hydrochloride in an antacid tablet is 0.000479 moles:
$0.000479 \text{ mol} = 4.79 \times 10^{-4} \text{ mol}$

6) Express 3489.23×10^7 in exponential notation
$3489.23 \times 10^7 = 3.48923 \times 10^{10}$

7) Express 23.18×10^{-13} in exponential notation
$23.18 \times 10^{-13} = 2.318 \times 10^{-12}$

8) Write the number 7.901×10^{-18} in standard form
$7.901 \times 10^{-18} = 0.000000000000000007901$

NAME: _____

DATE: _____ **PERIOD:** _____

Scientific Notation Practice

Express each of the following numbers in correct scientific notation:

1) 0.00374 _____

2) 1200 _____

3) 4063.89 _____

4) 175.1×10^{3} _____

5) 6460.4×10^{7} _____

6) 0.06627×10^{-25} _____

7) 9475×10^{-6} _____

8) 0.00374×10^{7} _____

9) 0.0000142×10^{1} _____

10) 17645 _____

11) 212,000,000 _____

12) 0.00266 _____

13) 843×10^{5} _____

14) 94.00×10^{6} _____

15) 0.0004963×10^{-4} _____

16) 843.214×10^{-3} _____

17) 0.00212×10^{12} _____

18). 0.00839×10^{2} _____

19) 894.13 _____

20) 0.0000008314 _____

21) 49000.6 _____

22) 9204×10^{5} _____

23) 87012×10^{23} _____

24) 0.001413×10^{-4} _____

25) 17645×10^{-15} _____