SCIENTIFIC NOTATION RULES

RULE #1: **Standard Scientific Notation** is a number from 1 to 9 followed by a decimal and the remaining significant figures and an exponent of 10 to hold place value.

Example:

$5.43 \times 10^{2} = 5.43 \times 100 = 543$

$8.65 \times 10^{-3} = 8.65 \times .001 = 0.00865$

****54.3 $\times 10^{1}$ **is not** Standard Scientific Notation!!!

RULE #2: When the decimal is moved to the Left the exponent gets Larger, but the value of the number stays the same. Each place the decimal moves Changes the exponent by one (1). If you move the decimal to the Right it makes the exponent smaller by one (1) for each place it is moved.

Example:

$6000. \times 10^{0} = 600.0 \times 10^{1} = 60.00 \times 10^{2} = 6.000 \times 10^{3} = 6000$

(Note: $10^{0} = 1$)

All the previous numbers are equal, but only 6.000×10^{3} is in proper Scientific Notation.

RULE #3: To add/subtract in scientific notation, the exponents must first be the same.

Example:

$(3.0 \times 10^{2}) + (6.4 \times 10^{3})$; since 6.4×10^{3} is equal to $64. \times 10^{2}$. Now add.

$$\begin{array}{l} (3.0 \times 10^{2}) \\ \underline{+ (64. \times 10^{2})} \\ 67.0 \times 10^{2} = 6.70 \times 10^{3} = \mathbf{\underline{6.7 \times 10^{3}}} \end{array}$$

- 67.0×10^{2} is mathematically correct, but a number in standard scientific notation can only have one number to the left of the decimal, so the decimal is moved to the left one place and one is added to the exponent.
- Following the rules for significant figures, the answer becomes 6.7×10^{3}.

RULE #4: To multiply, find the product of the numbers, then add the exponents.

Example:

$(2.4 \times 10^{2})(5.5 \times 10^{-4}) = ?$ [2.4 x 5.5 = 13.2]; [2 + -4 = -2], so

$(2.4 \times 10^{2})(5.5 \times 10^{-4}) = 13.2 \times 10^{-2} =$ **$\underline{1.3 \times 10^{-1}}$**

RULE #5: To divide, find the quotient of the number and subtract the exponents.

Example:

$(3.3 \times 10^{-6}) / (9.1 \times 10^{-8}) = ?$ [3.3 / 9.1 = .36]; [-6 – (-8) = 2], so

$(3.3 \times 10^{-6}) / (9.1 \times 10^{-8}) = .36 \times 10^{2} =$ **$\underline{3.6 \times 10^{1}}$**