

## PERFORMING CALCULATIONS IN SCIENTIFIC NOTATION

 $3.45 \times 10^{-2}$ 


+   -   ~~X~~   ÷

## Scientific Notation II Math Calculations

Mr. Sudbury

### Sci Not w/ Calculators

- ▶ To keep order of operations correct, put all your ( $M \times 10^n$ ) in parenthesis before you +, -, x, /
- ▶  $5.6 \times 10^4 + 3.2 \times 10^7 = 3.2056 \times 10^7$
- ▶  $1.3 \times 10^8 - 9.1 \times 10^3 = 1.299909 \times 10^8$
- ▶  $4.9 \times 10^{-2} \times 8.8 \times 10^9 = 4.312 \times 10^8$
- ▶  $-2.3 \times 10^3 / -7.1 \times 10^2 = 3.2394 \times 10^0$

### Shortcut to Math in Scientific Notation

- ▶ **Addition & Subtraction:**
  - The M (coefficient) can be added or subtracted as long as the n (exponent)s are the same.
- ▶ **Multiplication:**
  - The M (coefficients) are multiplied and the n (exponent)s are added.
- ▶ **Division:**
  - The M (coefficients) are divided and the (n) exponent of the denominator (bottom) is subtracted from that of the numerator (top).

$$\begin{array}{r} 4 \times 10^6 \\ + 3 \times 10^6 \\ \hline 7 \times 10^6 \end{array}$$

IF the exponents are the same, we simply add or subtract the numbers in front and bring the exponent down unchanged.

$$\begin{array}{r} 4 \times 10^6 \\ - 3 \times 10^6 \\ \hline 1 \times 10^6 \end{array}$$

The same holds true for subtraction in scientific notation.



$$\begin{array}{r} 4 \times 10^6 \\ + 3 \times 10^5 \\ \hline \end{array}$$

If the exponents are NOT the same, we must move a decimal to make them the same.

$$\begin{array}{r} 40.00 \times 10^5 \\ + 3.00 \times 10^5 \\ \hline 43.00 \times 10^5 \\ = 4.300 \times 10^6 \end{array}$$

*Student A*

To ~~NO!~~ **NO!** this is not a good scientific notation? the smaller number!

$$\begin{array}{r} 4.00 \times 10^6 \\ + 3.00 \times 10^5 \\ \hline 4.30 \times 10^6 \end{array}$$

*Student B*

**YES!** ← Is this good scientific notation?

A Problem for you...

$$\begin{array}{r} 2.37 \times 10^{-6} \\ + 3.48 \times 10^{-4} \\ \hline \end{array}$$

Solution...

$$\begin{array}{r} 002.37 \times 10^{-4} \\ + 3.48 \times 10^{-4} \\ \hline 3.5037 \times 10^{-4} \end{array}$$

Sample Problems

**Addition & Subtraction:**  
The M (coefficient) can be added or subtracted as long as the n (exponent)s are the same.

1.  $2.2 \times 10^3 + 7.2 \times 10^3 = \underline{\hspace{2cm}}$

## Sample Problems

### Addition & Subtraction:

The M (coefficient) can be added or subtracted as long as the n (exponent)s are the same.

2.  $9.1 \times 10^5 - 7.1 \times 10^5 = \text{-----}$

## Sample Problems

### Multiplication:

The M (coefficients) are multiplied and the n (exponent)s are added.

3.  $-2.0 \times 10^2 \times 3.0 \times 10^3 = \text{-----}$

## Sample Problems

### Division:

The M (coefficients) are divided and the (n) exponent of the denominator (bottom) is subtracted from that of the numerator (top).

4.  $1.6 \times 10^5 / 1.4 \times 10^2 = \text{-----}$