1) **Multiplication/ Division Rules**:

The number that has *"the fewest number of Significant Figures*" decides the number of significant figures in the final answer.

Example:

2.711 x 6.3 = 17.0793 => 17

4 SF 2 SF

2 SF in the final answer (Choose *the fewest SF)*

2) **Addition/ Subtraction Rules**:

When two numbers are added or subtracted the final answer should not have greater certainty than the original measurements.

Round the result of addition/subtraction to the same decimal place as the measurement with the highest/biggest uncertainty.

Example:

2.042 + 3.2 – 0.123 = 5.365 => 5.4

1000ths 10ths 1000ths *The final answer rounds to the tenths place*

The highest uncertainty is in the tenths place

- **Addition/ Subtraction of Scientific Numbers with the *SAME* Exponents:**

Step 1: If exponents are the same, then proceed with the addition/ subtraction operations immediately.

Example:

$(2.661 \times 10^3) + (3.01 \times 10^3) = 5.671 \times 10^3 \Rightarrow 5.67 \times 10^3$

1000ths 100ths *The final answer rounds to the hundredths place*

The highest uncertainty is in the hundredths place.

- **Addition/ Subtraction of Scientific Numbers with *DIFFERENT* Exponents**:

Step 1: Make exponents the same.

Step 2: Perform the addition or subtraction operation.

Step 3: After the exponents have been made the same, round answer to the same decimal place as the measurement with the highest/biggest uncertainty.

Step 4: Make sure the final answer is in standard scientific notation.

Example: $(9.98 \times 10^{-3}) + (8.04 \times 10^{-5}) = ?$

Step 1: 8.04×10^{-5} becomes 0.0804×10^{-3}

Step 2 and 3: $(9.98 \times 10^{-3}) + (0.0804 \times 10^{-3}) = 10.0604 \times 10^{-3} =$ 10.06×10^{-3}

100ths 10,000ths

The highest uncertainty is in the hundredths place.

Step 4: The correct scientific notation adjustment must be made! Final answer => 1.006×10^{-2}

Special Cases:

Internal Zeros are ALWAYS *Significant*

Example: 4.001 => 4 Significant Figures

Leading Zeros are NEVER *Significant*

Example: 0.000007 => 1 Significant Figure

Trailing Zeros are *Significant* ONLY IF the decimal point is specified

Example: 200000 => 1 Significant Figure

200. => 3 Significant Figures

200.1 => 4 Significant Figures

Practice Problems:

1. $414 + 7750 + 2500 =$
2. $0.254 - 0.367 + 5.4892 =$
3. $24.8 \times 6.4 \times 301 =$
4. $(2.66 \times 10^{4}) - (1.03 \times 10^{3}) =$
5. $5.905 / 14.0 =$
6. $(112 \times 0.456) / (3.2 \times 120) =$

Solutions: (1) 10700, (2) 5.376, (3) 48000 or 4.8×10^{4}, (4) 2.56×10^{4}, (5) 0.422, (6) 0.13