Adding and Subtracting in Scientific Notation

If the power of 10 has the **same** power (exponent, add or subtract the first factor and **keep** the power of 10.

Example: \((2.3 \times 10^4) + (4.1 \times 10^4)\)  

\[
\begin{align*}
+ & \quad \frac{2.3}{\text{6.4}} \\
= & \quad \frac{6.4 \times 10^4}{6.4}
\end{align*}
\]

Practice:
1. \((3.59 \times 10^{-2}) - (1.23 \times 10^2)\)  
2. \((6.15 \times 10^6) + (1.7 \times 10^6)\)

\[
\begin{align*}
- & \quad \frac{3.59}{\text{1.23}} \\
= & \quad \frac{2.36 \times 10^{-2}}{1.23} \\
+ & \quad \frac{6.15}{\text{1.7}} \\
= & \quad \frac{7.85 \times 10^6}{1.7}
\end{align*}
\]

What if the powers (exponents) are not the same?

To add or subtract in scientific notation the power of ten must have the **same** exponent.

Add: \((2.1 \times 10^6) + (4.5 \times 10^3)\)

**Step 1:**
Find the **smallest** exponent and move the decimal to the **left** the amount of spaces it takes to change the exponent to the larger exponent.

\[4.5 \times 10^3 = 0.0045 \times 10^6\]

**Step 2:**
Add the numbers with the **same** power of 10.

\[(2.1 \times 10^6) + (0.0045 \times 10^6) = \frac{2.1045 \times 10^6}{2.1045}\]

Practice:
1. \((2.4 \times 10^4) + (5.78 \times 10^7)\)
2. \((5.63 \times 10^9) - (4 \times 10^8)\)

\[
\begin{align*}
= & \quad \frac{2.4}{\text{5.7824 \times 10^7}} \\
= & \quad \frac{5.7824 \times 10^7}{5.7824}
\end{align*}
\]

\[
\begin{align*}
= & \quad \frac{5.23 \times 10^9}{5.23 \times 10^9}
\end{align*}
\]
Adding and Subtracting in Scientific Notation Understanding Check

\[(5.5 \times 10^2) + (6.5 \times 10^2)\]
\[= 12.0 \times 10^2\]

\[(2.6 \times 10^5) - (8.7 \times 10^7)\]
\[= \frac{2.6}{7-5} = 2\]

\[(6.3 \times 10^{-6}) + (5.1 \times 10^{-6})\]
\[= 1.14 \times 10^{-6}\]

\[(4.1 \times 10^6) + (6.8 \times 10^5)\]
\[= 4.08 \times 10^6\]

\[(2.4 \times 10^4) - (5.6 \times 10^4)\]
\[= -3.2 \times 10^4\]

\[6.9 - 0.00069 = 5.39931 \times 10^{-2}\]