Warmup:

Simplify:

$$\frac{7^8}{7^2} = 7^{8-2} = 7^6 \qquad 8^9 \cdot 8^{-13} = 8^{-4} \qquad \left(\frac{1}{9}\right)^{-4} = 9^4$$

$$\frac{1}{8^4}$$

Write in Scientific Notation:

3,450,000   0.00000239

$3.45 \times 10^{\,6}$ 2.39×10^{-6}

Adding and Subtracting with Scientific Notation

* To change the exponent count how many times you need to move the decimal, if you move decimal *forward* **add** that number to the exponents, if you move the decimal *back* **subtract** that number from the exponent.

Practice:

4.6×10^8 (Change it to 10^4)

3.3×10^3 (Change it to $\underline{10^5}$)

$4.6 \times 10^8 \rightarrow 10^4$

46000×10^4

$3.3 \times 10^3 \rightarrow 10^5$

0.033×10^5

Adding with Scientific Notation

1. Make sure that exponents of both numbers are the same.*
2. Add decimals, don't forget to line up the decimal points. Keep exponents the same.
3. Make sure you have one digit (non zero) in front of the decimal.*

$(9.7 \times 10^6) + (5.4 \times 10^4)$

$$
\begin{array}{r}
9.7 \times 10^6 \\
+\ 5.4 \times 10^4 \\
\hline
15.1 \times 10^{10}
\end{array}
$$

$$10^6 \cdot 10^4$$

$$1.51 \times 10^{11}$$

You try!

$(4.5 \times 10^4) + (3.2 \times 10^6)$

$$4.5 \times 10^4$$
$$+ 3.2 \times 10^6$$
_____

Subtracting with Scientific Notation

1. Make sure that exponents of both numbers are the same.*
2. Subtract decimals, don't forget to line up the decimal points. Keep exponents the same.
3. Make sure you have one digit (non zero) in front of the decimal.*

$(1.7 \times 10^8) - (7.2 \times 10^7)$

$$1.7 \times 10^8$$
$$+ -7.2 \times 10^7$$
$$\overline{}$$
$$-5.5 \times 10^{15}$$

$$10^8 \cdot 10^7$$

$$\overset{6}{\cancel{7}}.2$$
$$-1.7$$
$$\overline{}$$
$$5.5$$

You Try!

$(2.6 \times 10^4) - (1.5 \times 10^3)$

1.1×10^7