

Day 3 ~Scientific Notation Multiplication and Division

Multiplication

When numbers in scientific notation are multiplied, only the number is multiplied. The exponents are added.

$$\begin{array}{c} \begin{array}{ccc} & \downarrow & \downarrow \\ (2.00 \times 10^3)(4.00 \times 10^4) & = & (2.00)(4.00) \times 10^{3+4} \\ & \uparrow & \uparrow \\ & = 8.00 \times 10^7 & \end{array} \end{array}$$

$$1) (6.0 \times 10^3) \times (1.5 \times 10^{-2})$$

$\begin{array}{r} 3 \\ 1.5 \\ \times 6 \\ \hline 9.0 \end{array}$ $(6.0 \times 1.5) \times 10^{3+(-2)}$
 9×10^1

$$2) (1.5 \times 10^{-2}) \times (8.0 \times 10^{-1})$$

$\begin{array}{r} 4 \\ 1.5 \\ \times 8 \\ \hline 12.0 \\ 12 \end{array}$ $(1.5 \times 8.0) \times 10^{-2+(-1)}$
 12×10^{-3}
 1.2×10^{-2}

Division

When numbers in scientific notation are divided, only the number is divided. The exponents are subtracted.

If your question asks how many times greater/faster/etc., you will divide!!

$$\frac{9.60 \times 10^7}{1.60 \times 10^4} = \frac{9.60}{1.60} \times 10^{7-4}$$
$$= 6.00 \times 10^3$$

$$3) \frac{7.8 \times 10^3}{1.2 \times 10^4} = \left(\frac{7.8}{1.2} \right) \times 10^{3-4}$$

$$6.5 \times 10^{-1}$$

$$\begin{array}{r} 1.2 \overline{) 7.8} \\ \underline{6.5} \\ 12 \overline{) 78.0} \\ \underline{-72} \downarrow \\ 60 \\ \underline{-60} \\ 0 \end{array}$$

$$4) \frac{8.1 \times 10^{-2}}{9.0 \times 10^2} = \left(\frac{8.1}{9.0} \right) \times 10^{-2-2}$$

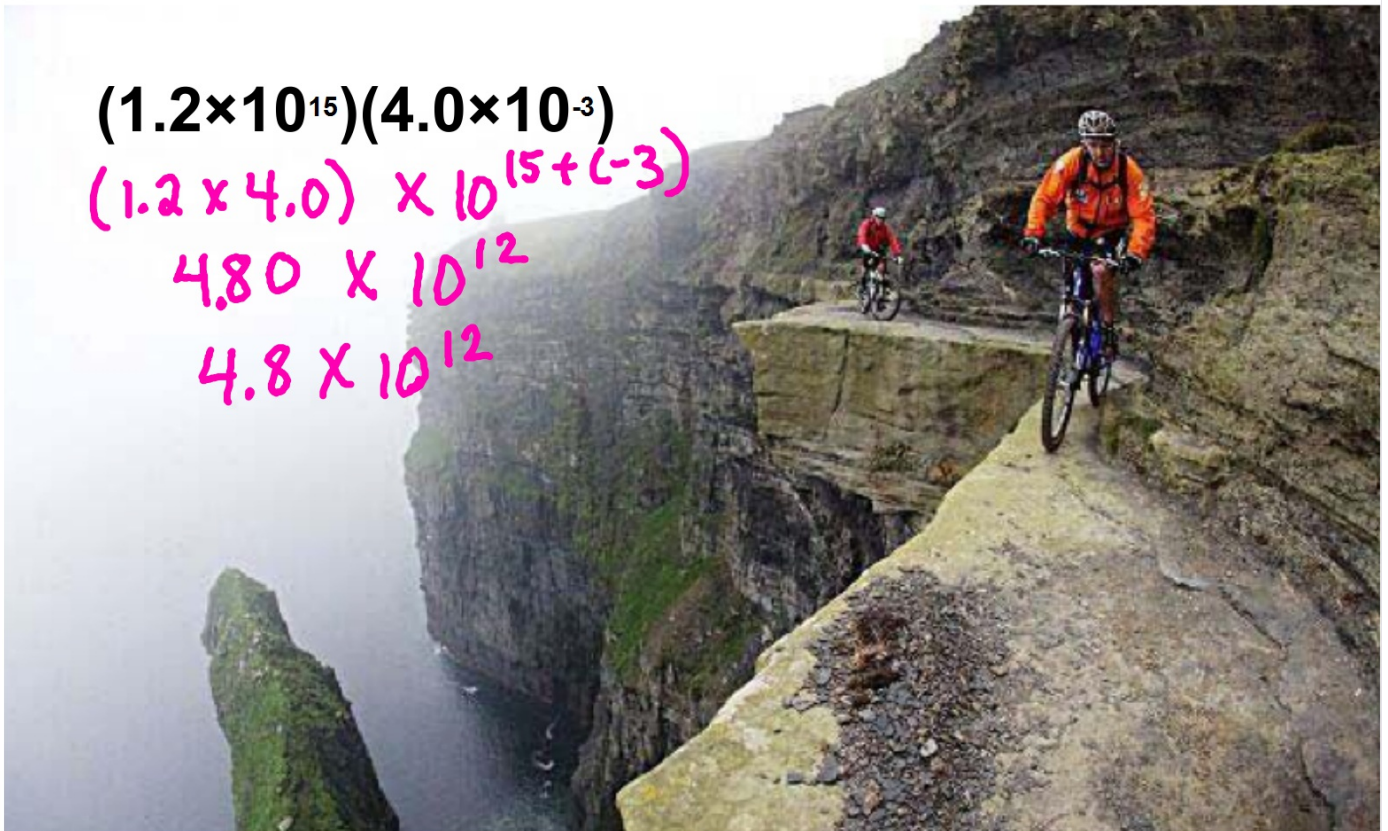
$$\begin{array}{l} .9 \times 10^{-4} \\ 9 \times 10^{-5} \end{array}$$

$$\begin{array}{r} 9 \overline{) 8.1} \\ \underline{8.1} \\ 0 \end{array}$$

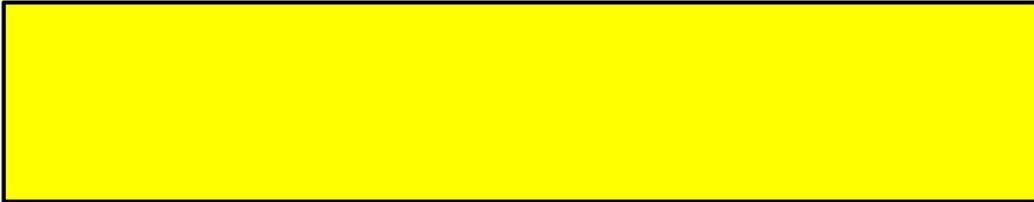
Scientific Notation:

Simplify:

$$\begin{aligned} & (1.2 \times 10^{15})(4.0 \times 10^{-3}) \\ & (1.2 \times 4.0) \times 10^{15+(-3)} \\ & 4.80 \times 10^{12} \\ & 4.8 \times 10^{12} \end{aligned}$$



How much larger is 6×10^5 compared to 2×10^3 ?



Which is the larger value: 2×10^6 or 9×10^5 ?



1. The mass of one oxygen atom is 2.66×10^{-26} kg. A cylinder contains 5.97×10^{23} oxygen atoms. What is the mass of the oxygen?

2. The average distance from Earth to the sun is 1.5×10^{11} m. The speed of light is 3×10^8 m/s. Approximately how long does it take for light to travel from the sun to Earth?