Scientific Notation

Scientific notation is a convenient way to express very large or very small numbers. A number in this form is written as $a \times 10^n$, where $1 \leq |a| < 10$ and n is an integer. For example, 3.62×10^5 and -1.2×10^{-4} are expressed in scientific notation.

To change a number from scientific notation to a number without exponents, look at the power of ten. If that number is positive, move the decimal point to the right. If it is negative, move the decimal point to the left. The number tells you how many places to move the decimal point.

For example,

$$3.97 \times 10^3 = 3970.$$

To change a number to scientific notation, move the decimal point so it is to the right of the first nonzero digit. If the decimal point is moved n places to the left and this makes the number smaller, n is positive; otherwise, n is negative. If the decimal point is not moved, n is 0.

For example, $0.0000216 = 2.16 \times 10^{-5}$.

MULTIPLYING AND DIVIDING IN SCIENTIFIC NOTATION

To multiply or divide numbers in scientific notation, we can change the order and grouping, so that we multiply or divide first the decimal parts and then the powers of 10. *For example,*

$$\begin{aligned} &(3.7 \times 10^{-3}) \cdot (2.5 \times 10^8) \\ &= (3.7 \times 2.5) \cdot (10^{-3} \times 10^8) \\ &= 9.25 \times 10^5. \end{aligned}$$