

Scientific Notation

A form to write really BIG or small numbers

ALWAYS a number. number $\times 10^{\text{some power}}$
power is positive for big
power is negative for small

Good

$$4.23 \times 10^8$$

$$3.57 \times 10^{-9}$$

Bad

$$.423 \times 10^9$$

$$35.7 \times 10^{-10}$$

Exponent tells you how far to move the decimal.

$$4.545 \times 10^7 = 45,450,000$$

$$4.545 \times 10^{-6} = 0.000004545$$

$$20234 = 2.0234 \times 10^4$$

$$0.00000000005 = 5.0 \times 10^{-10}$$

Adding & Subtracting in Scientific Notation

Method 1

- convert to standard form
- add or subtract
- Convert to scientific Notation

Example

$$(1.2 \times 10^8) + (4.5 \times 10^6) =$$
$$\begin{array}{r} 120000000 \\ + 4500000 \\ \hline 124500000 \end{array}$$
$$= 1.245 \times 10^8$$

Method 2

- convert powers of 10 to match
- Add your lead numbers & leave 10's alone
- You're done

$$(1.2 \times 10^8) + (4.5 \times 10^6) =$$
$$(1.2 \times 10^8) + (.045 \times 10^8)$$
$$1.245 \times 10^8$$

$$(2.1 \times 10^3) + (4.3 \times 10^2) = 2.53 \times 10^3$$

$$(1.5 \times 10^5) + (1.1 \times 10^3) = 1.511 \times 10^5$$

$$(3.0 \times 10^4) - (9.0 \times 10^3) = 2.1 \times 10^4$$

$$(4.5 \times 10^3) - (1.0 \times 10^1) = 4.49 \times 10^3$$

Multiplication

- Multiply lead numbers
- Add exponents on 10's
- Combine & check format.

$$(4.0 \times 10^6)(3.0 \times 10^8)$$

step 1
4x3

14+1

step 3

$$12 \times 10$$

$$1.2 \times 10^{15}$$

Division


- Divide lead #'s
- Subtract exponents
- combine & check

$$4.0 \times 10^6$$

$$\underline{3.0 \times 10^8}$$

$$1.33 \times 10^{-2}$$




$$10^4 = 1.0 \times 10^4$$