

Scientific Notation

- more convenient to express very large or very small numbers
- to express values with the correct number of significant digits

format:

$$\underline{n} \times 10^? \quad 1 \leq n < 10$$

Examples:

$$\underline{1525} \text{ g} = 1.525 \times 10^3 \text{ g}$$

$$\underline{0.00471} \text{ m} = 4.71 \times 10^{-3} \text{ m}$$

$$7.81 \times 10^{-2} \text{ km} = 0.0781 \text{ km}$$

$$6.02 \times 10^{23} = 602 + 21 \text{ zeros}$$

$$\underline{565} \times 10^{-9} \text{ m} = 5.65 \times 10^{-7} \text{ m}$$

Calculations Involving Scientific Notation

Multiplication & Division

$$\left(\frac{6.6 \times 10^{-8}}{3.3 \times 10^{-4}} \right) = 2.0 \times 10^{-8-(-4)}$$

← subtract exponents when dividing

$$= 2.0 \times 10^{-4}$$

$$(2.5 \times 10^{-6}) \times (3.0 \times 10^{-7}) = 7.5 \times 10^{-13}$$

Addition & Subtraction:

$$(2.67 \times 10^{-3}) - (9.5 \times 10^{-4})$$

↓ change to 10⁻⁴

$$= (26.7 \times 10^{-4}) - (9.5 \times 10^{-4})$$

$$= 17.2 \times 10^{-4}$$

$$= 1.72 \times 10^{-3}$$

Think about:

line	up	the	place	values	1250
					4.25
					0.019
					416
					+ 22

↑ need the same power of 10.

Homework

1. a) $4.5 \times 10^7 + 6.45 \times 10^7$

b) $5.4 \times 10^7 + 7.8 \times 10^6$

c) $7.8 \times 10^{-6} - 8.4 \times 10^{-7}$

d) $2.3 \times 10^4 - 4.2 \times 10^3$

e) $6.7 \times 10^{-8} + 8.2 \times 10^{-7}$

2. a) $(4.5 \times 10^2)(2.3 \times 10^{-4})$

b) $(2.0 \times 10^6)(3.5 \times 10^{-9})$

c) $(1.2 \times 10^7)(1.2 \times 10^4)$

d)
$$\frac{6.0 \times 10^7}{1.5 \times 10^2}$$

e)
$$\frac{7.2 \times 10^{-4}}{1.2 \times 10^{-4}}$$

f)
$$\frac{(5.5 \times 10^{-5})(6.0 \times 10^4)}{(2.1 \times 10^4)}$$