

# Standard Form or Scientific Notation



HOMEWORK:

Page 23-1M: all & Page 24-25: all

In IB it is called: Standard Form

- What you may see in old IB questions

✓ Standard Form (Very old questions)

✓ In the form of

$a \times 10^k$ , where  $1 \leq a < 10$  and  $k$  is an integer

- What you will see in recent IB Questions and in your exams in May ~~2015~~ 2015

$a \times 10^k$ , where  $1 \leq a < 10$  and  $k \in \mathbb{Z}$

- **Please, Please: Scientific Notation is always worth 2 points, one for the number part and one for the power part. Don't lose these 2 points. It's silly!!**

$$a \times 10^k$$

How does it work?

- ( $1 \leq a < 10$ ). This means that <sup>the</sup> number part (a) must have one digit in the ones:
  - $\textcircled{1}.256$
  - $\textcircled{4}.5$
  - $\textcircled{9}.76$
  - $\textcircled{5}$
- $10^k \Rightarrow$  Power of 10 part. You must always write the       $k$       in your power of 10. Even if it is      1      or      0     .

eg.

$30 \rightarrow 3.00 \times 10^{\textcircled{1}}$

$5 \rightarrow 5 \times 10^{\textcircled{0}}$

$$a^5 \times a^3 = a^8$$

$$a^{-1} = \frac{1}{a} \quad a a^2 = \frac{1}{a^2}$$

Write the following numbers in proper Standard Notation

- 0.56784

$$5.6784 \times 10^{-1}$$

- 123,456,789

$$1.23456789 \times 10^8$$

- 123.456

$$1.23456 \times 10^2$$

- 0.000567

$$5.67 \times 10^{-4}$$

10230

- $10.23 \times 10^3$

$$1.023 \times 10^3 \times 10^1$$

$1.023 \times 10^4$

- $0.8965 \times 10^5$

$$8.965 \times 10^4$$

- $0.9876 \times 10^{-7}$

$$9.876 \times 10^{-7} \times 10^{-1}$$

$$9.876 \times 10^{-8}$$

- $13.567 \times 10^{-6}$

$$1.3567 \times 10^{-5}$$

NOW, THE  
OTHER WAY  
AROUND

You also need to know how to go from  
Scientific Notation to ordinary form

$$\begin{array}{c|c} 2.58 \times 10^{-3} & 1.9 \times 10^{10} \\ \hline 0.00258 & 19,000,000,000 \end{array}$$

Too easy!

## Operations with S.N.

**Note:** use your calculator as much as possible,  
**but** do not write your number in calculator  
notation "E"

- Add/Subtracting

$$(1.234 \times 10^5) - (3.789 \times 10^7)$$

from GDC - 37766600  
- 3.77666 × 10<sup>7</sup>

$$(4.2 \times 10^6) + (1.5 \times 10^6)$$

5700000  
5.7 × 10<sup>6</sup>

- Multiplying and  
dividing

$$(1.2 \times 10^3)(2.1 \times 10^{-4})$$

2.52 × 10<sup>-1</sup>

$$\frac{2.4 \times 10^{-5}}{1.2 \times 10^{-6}}$$

2.0 × 10<sup>1</sup>

$$\text{GDC} \rightarrow 3.67\text{E}8$$

on the paper

$$3.67 \times 10^8$$

## Work in class!!

- Typical IB Question:

a) Calculate:

$$\frac{77.2 \times 3^3}{3.60 \times 2^2}$$

b) Express your answer to part (a) in the form  $a \times 10^k$ , where  $1 \leq a < 10$

a) This is what we call a GDC question. Make sure you enter (parenthesis)

$$(77.2 \times 3^3) \div (3.6 \times 2^2)$$

$$= 144.75$$

b)  $1.4475 \times 10^2$