📘 Standard Form (Scientific Notation)

🔷 1. Definition and Format

Standard Form is a way of writing very large or very small numbers using powers of 10.

A number is written in standard form if it is in the format:

$$A \times 10^n$$

Where:

- $1 \leq A < 10$
- n is an integer (can be positive or negative)

✅ **Examples:**

- $3.2 \times 10^4 = 32000$ → large number
- $5.67 \times 10^{-3} = 0.00567$ → small number

🔷 2. Converting Numbers Into and Out of Standard Form

🟦 A. Converting from Ordinary Numbers → Standard Form

1. Move the decimal point to make the number between 1 and 10.
2. Count how many places you moved the decimal:
   - If you moved it **left**, n is **positive**.
   - If you moved it **right**, n is **negative**.

✏️ **Examples:**

1. **12,300** → Move decimal 4 places left:

$$1.23 \times 10^4$$

2. **0.0065** → Move decimal 3 places right:

$$6.5 \times 10^{-3}$$

🟨 B. Converting from Standard Form → Ordinary Numbers

Multiply the number by 10^n:

- If n is **positive**, move decimal **right**.
- If n is **negative**, move decimal **left**.

✏️ Examples:

1. $4.7 \times 10^5 = 470000$
2. $9.1 \times 10^{-2} = 0.091$

🔷 3. Calculating with Standard Form

🟧 A. Multiplying in Standard Form

Use the rule:

$$(A \times 10^m) \times (B \times 10^n) = (A \times B) \times 10^{m+n}$$

✏️ Example:

$$(3 \times 10^4) \times (2 \times 10^3) = 6 \times 10^7$$

🟪 B. Dividing in Standard Form

Use the rule:

$$\frac{A \times 10^m}{B \times 10^n} = \left(\frac{A}{B}\right) \times 10^{m-n}$$

✏️ Example:

$$\frac{6 \times 10^8}{2 \times 10^3} = 3 \times 10^5$$

🟩 C. Adding or Subtracting in Standard Form

Step-by-step:

1. Make sure both numbers have the **same power of 10**.
2. Add or subtract the numbers (A values).
3. Write the result in standard form if needed.

✏️ Example:

$$(3.2 \times 10^4) + (6.8 \times 10^4) = 10.0 \times 10^4 = 1.0 \times 10^5$$

📌 Summary Table

Operation	Rule / Tip
Multiply	Multiply A values, add powers: $A \times B \times 10^{m+n}$
Divide	Divide A values, subtract powers: $\frac{A}{B} \times 10^{m-n}$
Add/Subtract	Match powers of 10, then operate on A values