Lecture 1

I. Scientific Notation and Power of Ten Notation

A. LARGE NOS

Power = exponent

10^2 = 10 \times 10 = (10)(10) = 1000 = 10 \times 10 = 100

10^3 = 1000

10^6 = 1,000,000

10^{35}

Also, Scientific Notation: 1.0 \times 10^y

Example:
Convert 2.3 \times 10^4 m to ordinary notation.

Solve: Long way: (2.3)(10000)m = 23000m

Short way: 23000m

B. SMALL NOS

10^0 = 1

10^{-1} = \frac{1}{10} = 0.1

10^{-2} = \frac{1}{10^2} = \frac{1}{100} = 0.01

10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001

10^{-4} = \frac{1}{10^4} = \frac{1}{10000} = 0.0001

10^{-5} = \frac{1}{10^5} = \frac{1}{100000} = 0.00001
### Physical Quantities

Physical Quantities are quantities that can be measured in the lab or in everyday life.

A. Length is a 1D measure of how long something is.

<table>
<thead>
<tr>
<th>Units (ENg.)</th>
<th>Foot (ft)</th>
<th>Units (METRIC)</th>
<th>Meter (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 in = 1 ft</td>
<td>100 cm = 1 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5280 ft = 1 mi</td>
<td>1000 m = 1 km</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SIDEBAR

<table>
<thead>
<tr>
<th>Name</th>
<th>Prefix</th>
<th>Symbol</th>
<th>Means</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mega</td>
<td>M</td>
<td>$10^6$</td>
<td>991 MHz</td>
<td>80 km</td>
</tr>
<tr>
<td>Kilo</td>
<td>K</td>
<td>$10^3$</td>
<td>7.2 cm</td>
<td>33.2 mm</td>
</tr>
<tr>
<td>Centi</td>
<td>c</td>
<td>$10^{-2}$</td>
<td>7.2 cm</td>
<td>33.2 mm</td>
</tr>
<tr>
<td>Milli</td>
<td>m</td>
<td>$10^{-3}$</td>
<td>7.2 cm</td>
<td>33.2 mm</td>
</tr>
<tr>
<td>Micro</td>
<td>µ</td>
<td>$10^{-6}$</td>
<td>7.2 cm</td>
<td>33.2 mm</td>
</tr>
</tbody>
</table>
B. Area is a 2D measure of the amount of surface.

**Example**

\[ ? \text{ cm}^2 = 1 \text{ m}^2 \]

3 Ways:

1. Use the recipe
   \[ \text{Area} = \frac{\text{length}}{\text{width}} \times (100 \text{ cm}) \times (100 \text{ cm}) = 10,000 \text{ cm}^2 \]

2. Visualize
   \[ 1 \text{ m}^2 = (100 \text{ cm}) \times (100 \text{ cm}) = 10,000 \text{ cm}^2 \]

3. \[ 100 \text{ cm} = 1 \text{ m} \]
   Square both sides
   \[ 10,000 \text{ cm}^2 = 1 \text{ m}^2 \]