

Math in Physics

SI Metric Units : Seconds, s.
kilograms, kg
meters, m.

SI prefixes: mill: 10^{-3}
cent: 10^{-2}
kilo 10^3
micro 10^{-6}

Unit Conversion: factor label method of unit conversion

Convert 25.2 km into m.

→ generate conversion factors. (relate $\frac{\text{wanted}}{\text{unwanted}}$)

→ expression equal to 1.

ex. $25.2 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} = 25200 \text{ m}$

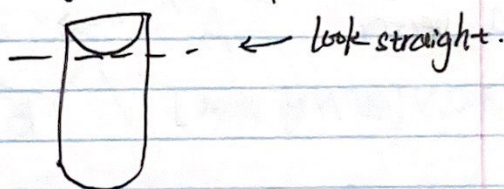
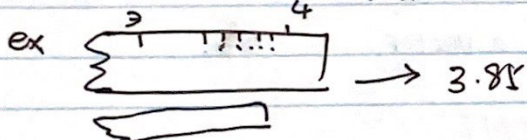
given $\times \frac{\text{wanted}}{\text{unwanted}} = \text{wanted}.$

ex. $175.2 \text{ m/s} \rightarrow ? \text{ km/h}$

$$\frac{175.2 \text{ m}}{1 \text{ s}} \times \frac{3600 \text{ s}}{1 \text{ h}} \times \frac{1 \text{ km}}{1000 \text{ m}} = 270.72 \text{ km/h}$$

$$\frac{2.0 \text{ m}}{\text{s}^2} \times \frac{1.296 \times 10^7}{\text{h}^2} \times \frac{1 \text{ km}}{1000 \text{ m}} = 25920 \text{ km/h}^2$$

Measurement. with the confidence of decimal place



Uncertainty: usually last digit

Precision: how close a value is to other measurements

Accuracy: how close a measurement is to the true answer.

Addition / subtraction with the least number of decimal places:

Multiplication / Division with the least number of sig figs.

Division:

Exact numbers don't affect the calculation, only measured values are considered.

Common Mathematical Relationship.

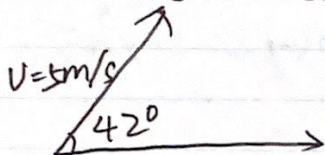
1. Linear Relationship:

$$y = mx + b$$

slope =

Kinematics - The physics of Motion

- There are two kinds of Physical Quantities: Vector and scalars.
- Scalars are quantities that have an amount (magnitude) but no direction.
 - Examples of scalars are time, temperature, energy and speed.
- Length of arrow represents the magnitude of vector
- Vector directions can be communicated with words (east, left, up) sign (+, -) or angles (220°), [30° E of N].
- Vectors are written as either bold font or with an arrow on top.



Describe a vector " \vec{A} " " \rightarrow " denotes a vector.

$$"\vec{A}" = 3.0\text{N}[40^\circ\text{N of west}] \quad / \quad \vec{B} = +30\text{N}[\rightarrow]$$

Reference Frames / Points

- A reference frame is any space considered stationary for the purposes of measurement.
- A reference point is a fixed point within that space that we consider the 'starting' point of the 'zero' point.

Position, Distance, Displacement.

- position (\vec{d} or \vec{x}) describes exactly where located