Types of Physical Quantity.

(1) <u>Ratio (numerical value only)</u>: When a physical quantity is a ratio of two similar quantities, it has no unit.

e.g. Relative density = Density of object/Density of water at 4°C

   Refractive index = Velocity of light in air / Velocity of light in medium

   Strain = Change in dimension/Original dimension

Note: Angle is exceptional physical quantity, which though is a ratio of two similar physical quantities (angle = arc / radius) but still requires a unit (degrees or radians) to specify it along with its numerical value.

(2) <u>Scalar (Magnitude only)</u>:These quantities do not have any direction e.g. Length, time, work, energy etc.

Magnitude of a physical quantity can be negative. In that case negative sign indicates that the numerical value of the quantity under consideration is negative. It does not specify the direction.

Scalar quantities can be added or subtracted with the help of following ordinary laws of addition or subtraction.

(3) <u>Vector (magnitude and direction)</u>: e.g. displacement, velocity, acceleration, force etc.

Vector physical quantities can be added or subtracted according to vector laws of addition. These laws are different from laws of ordinary addition.

Note: There are certain physical quantities which behave neither as scalar nor as vector. For example, moment of inertia is not a vector as by changing the sense of rotation its value is not changed.

It is also not a scalar as it has different values in different directions (i.e. about different axes). Such physical quantities are called Tensors.