# Book Notes

## Elance

## Vector Mathematics

**Vector**: Line with direction / Magnitude

**Scalar:** Length or magnitude of the vector |**u**| (acceleration?)

**Zero vector:** A vector that has 0 length, definite direction |**o**|

**Unit Vector:** A vector with a reference magnitude of 1 for easy maths

EQUALITY = (free) v**ectors have same length and direction, despite translation, parallelograms**

*(Bound vectors) Forces acting on a rigid body are not free, because translating them has different effects. Hence bound vectors are bound to a third property- position in space*

ADDITION: Translation, rectilinear replacement, triangle construction

1) AB+BC=AC (two added vectors have the same outcome in terms of destination, they cancel each other out), vector sum: if they start and end at the same point, they cancel to 0, i.e. zero work was done

2) |u+v| <= |u| + |v|, equal when they have the same direction

3) Commutive law; u + v = v + u

4) associative law: (u+v) +w = u + (v + w)

**The sum of any number of vectors is independent of order in which they are added and of their grouping in partial sums (operations are atomic!)**

MULTIPLICATION