SI units

Mass	kg
Distance	m
Time	s
Force	N

Prefixes

Kilo	10^3
Hecto	10^2
Deka	10^1
Deci	10^-1
Centi	10^-2
Milli	10^-3
Nano	10^-9

Vector Operations

Dot Product	a dot b = sum of vector components multiplied
Cross Products	Determinant of (i j k, x y z, x y z)

Notes

Notes

1d motion

v_avg = delta x/ delta t

v = dx/dt

displacement is scalar, distance is vector

5 function

d = v * t

v = a * t + v_0

$x = 1/2\ a * t^2 + v_0 * t + x_0$

$v^2 - v_0^2 = 2 * a * d$

x = (v+v_0)t/2

Vector Notations

$$\vec{v} = v_x\hat{i} + v_y\hat{j} + v_z\hat{k} = \frac{dx}{dt}\hat{i} + \frac{dy}{dt}\hat{j} + \frac{dz}{dt}\hat{k}$$
$$\vec{a} = a_x\hat{i} + a_y\hat{j} + a_z\hat{k} = \frac{dv_x}{dt}\hat{i} + \frac{dv_y}{dt}\hat{j} + \frac{dv_z}{dt}\hat{k}$$

Rotational Acceleration

$a_c = v^2/r$

T = period

v = 2pir/T

Notes

Newtons Laws

1. If sum forces = 0, no acceleration. At rest stays at rest, motion stays at same speed

2. net force = mass * acceleration

3. if object A pushes on B, (F_ab) then object b exerts equal force on object A (F_ba)

Force

Force is a vector

Net force = sum of all forces

Normal force is from surface on object, perpendicular

friction is from surface on object, parallel to surface

Tension from pulling force

Weight pull of gravity (mg)