

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	$\mathbf{a} \cdot \mathbf{b}$ = sum of vector components multiplied
Cross Products	Determinant of $(\mathbf{i} \ \mathbf{j} \ \mathbf{k}, \ x \ y \ z, \ x \ y \ z)$

Notes



Notes



1d motion

$$v_{\text{avg}} = \Delta x / \Delta t$$

$$v = dx/dt$$

displacement is scalar, distance is vector

5 function

$$d = v \cdot t$$

$$v = a \cdot t + v_0$$

$$x = \frac{1}{2} a \cdot t^2 + v_0 \cdot t + x_0$$

$$v^2 - v_0^2 = 2 \cdot a \cdot d$$

$$x = (v + v_0) \cdot t / 2$$

Vector Notations

$$\mathbf{v} = v_x \mathbf{i} + v_y \mathbf{j} + v_z \mathbf{k} = \frac{dx}{dt} \mathbf{i} + \frac{dy}{dt} \mathbf{j} + \frac{dz}{dt} \mathbf{k}$$

$$\mathbf{a} = a_x \mathbf{i} + a_y \mathbf{j} + a_z \mathbf{k} = \frac{dv_x}{dt} \mathbf{i} + \frac{dv_y}{dt} \mathbf{j} + \frac{dv_z}{dt} \mathbf{k}$$

Rotational Acceleration

$$a_c = v^2 / r$$

T = period

$$v = 2\pi r / T$$

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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)



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