

Kinematics

$$\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$$

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$$

$$\vec{d} = \vec{v}_i t + \frac{1}{2} \vec{a} t^2$$

$$\vec{v}_c = \frac{2\pi r}{T}$$

$$\vec{d} = \vec{v}_f t - \frac{1}{2} \vec{a} t^2$$

$$\vec{d} = \left(\frac{\vec{v}_f + \vec{v}_i}{2} \right) t$$

$$v_f^2 = v_i^2 + 2\vec{a}\vec{d}$$

$$\vec{a}_c = \frac{\vec{v}^2}{r}$$

Dynamics

$$\vec{a} = \frac{\vec{F}_{net}}{m}$$

$$|\vec{F}_f| = \mu |\vec{F}_N|$$

$$\vec{F}_r = -k\vec{x}$$

$$|\vec{F}_g| = \frac{Gm_1m_2}{r^2}$$

$$|\vec{g}| = \frac{Gm_1}{r^2}$$

$$\vec{g} = \frac{\vec{F}_g}{m}$$

Energy

$$W = \vec{F}\vec{d} \cos \theta$$

$$W = \Delta E$$

$$P = \frac{W}{t}$$

$$E_k = \frac{1}{2}mv^2$$

$$E_p = mgh$$

$$E_p = \frac{1}{2}kx^2$$

Waves and Simple Harmonic Motion

$$T = 2\pi\sqrt{\frac{m}{k}}$$

$$T = 2\pi\sqrt{\frac{l}{g}}$$

$$T = \frac{1}{f}$$

$$v = f\lambda$$

$$f = \left(\frac{v_o}{v_o \pm v_s} \right) f_s$$

$$v_{max} = A\sqrt{\frac{k}{m}}$$

$$l = \frac{\lambda_1}{4}$$

$$l = \frac{\lambda_1}{2}$$

Satellites

$$K = \frac{T^2}{r^3}$$

$$\frac{T_a^2}{r_a^3} = \frac{T_b^2}{r_b^3}$$

Constants

Acceleration due to gravity...	$g = 9.81 \text{ m/s}^2$ ou 9.81 N/kg
Gravitational Constant	$G = 6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2\text{kg}^2$
Radius of the Earth	$r_e = 6.37 \times 10^6 \text{ m}$
Mass of the Earth	$M_e = 5.98 \times 10^{24} \text{ kg}$
Speed of light in a vacuum	$c = 3.00 \times 10^8 \text{ m/s}$
Mass of an alpha particle	$m_\alpha = 6.65 \times 10^{-27} \text{ kg}$
Mass of an electron	$m_e = 9.11 \times 10^{-31} \text{ kg}$
Mass of a proton	$m_p = 1.67 \times 10^{-27} \text{ kg}$
Mass of a neutron	$m_n = 1.67 \times 10^{-27} \text{ kg}$

Trigonometry et Geometry

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c^2 = a^2 + b^2 - 2ab \cos \theta$$

$$c^2 = a^2 + b^2 \quad \text{slope } m = \frac{\Delta y}{\Delta x}$$

Area

$$\text{Rectangle} = lw$$

$$\text{Triangle} = \frac{1}{2}ab$$

$$\text{Circle} = \pi r^2$$

Circumference

$$\text{Circle} = 2\pi r$$

Prefixes used with SI Units

Prefix	Symbol	Exponential Value
atto	a	10^{-18}
femto	f	10^{-15}
pico	p	10^{-12}
nano	n	10^{-9}
micro	μ	10^{-6}
milli	m	10^{-3}
centi	c	10^{-2}
deci	d	10^{-1}
deca	da	10^1
hecto	h	10^2
kilo	k	10^3
mega	M	10^6
giga	G	10^9
tera	T	10^{12}