Constants and conversion factors

universal gravitation: $G = 6.67 \times 10^{-11}$ N m^2/s^2
mass of earth: $M_E = 5.98 \times 10^{24}$ m
radius of earth: $r_E = 6378$ km

1 mi = 1609 m
1 ft = 0.305 m
T(K) = T(C) + 273
T(C) = (5/9)(F -32)
1 atm = 101.3×10^3 Pa = 14.7 psi

Kinematics

displacement x, velocity v, acceleration a and time t

Set of equations for constant acceleration:
$v_f = v_i + at$
$x_f = x_i + v_i t + 1/2at^2$
$x_f = x_i + 1/2(v_i + v_f)t$
$v_f^2 = v_i^2 + 2a(x_f - x_i)$

constant circular acceleration, same set of equations with angular displacement Θ, angular velocity ω, angular acceleration α.

tangential velocity $v_T = s/t$ (s arc length, t time)
$v_T = r\omega$ (r radius)
tangential acceleration
$a_T = r\alpha$ (α in rad/s^2)
centripetal acceleration $a_C = v^2/r = r\omega^2$
$\omega = 2\pi/T$ (T period is time for one revolution)

Newton's Second Law

$\Sigma F = ma$ (m mass, F force)
$\Sigma \tau = i\alpha$ (i moment of inertia, $i = mr^2$)

Work
$W = F\, d \cos(\Theta)$ (d displacement, F force, Θ angle between the two)

Work = final total mechanical energy minus initial total mechanical energy

Power = Work per time or Power = Force times Velocity

Energy

potential gravitational energy PE = mgh

(m mass, g gravitational acceleration, h height)

elastic potential energy PE = $1/2kx^2$

(k spring constant, x compression)

kinematic energy KE = $1/2mv^2$

(m mass, v velocity)

Momentum

p = mv

Impuls J = $F_{avg} * \Delta t$

Impuls = change of momentum

Friction force

$F_f = \mu F_N$ (μ friction coefficient and F_N normal force)

Spring force

$F_s = k x$ (k spring constant, x compression)

Centripetal force

$F_C = G mM_E/r^2 = mv^2/r$

center of mass

$x_{cm} = (m_1x_1 + m_1x_2)/m_1+m_2$

Torque = magnitude of force times lever arm

Angular momentum L = i ω