

Useful Formulas

Motion along a straight Line

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

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

x: position a: acceleration

v: velocity t: time

$$v^2 - v_0^2 = 2 a \Delta x$$

$$a_{\text{avg.}} = \Delta v / \Delta t$$

F: force m: mass

x_0 : initial position

$$v = v_0 + a t$$

$$F = m a$$

v_0 : initial velocity

Circular Motion:

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

$$F_c = m a_c$$

F_c : centripetal force

$$F_c = m 4 \pi^2 r / T^2$$

v_t : tangential speed

$$a_c = v^2 / r = 4 \pi^2 r / T^2$$

a_c : centripetal acceleration

T: period r: radius

Work and Energy:

$$\text{GPE} = m g h$$

$$W = F d$$

W: work

P: power

$$\text{KE} = \frac{1}{2} m v^2$$

$$P = W / t$$

GPE: gravitational potential energy

$$W = \Delta E$$

KE: kinetic energy

Momentum and Impulse

$$p = m v$$

$$J = F t = m \Delta v$$

p: momentum

J: impulse

Miscellaneous

$$\sin \theta = O / H \quad \cos \theta = A / H \quad \tan \theta = O / A$$

$$g = 9.8 \text{ m/s}^2 \text{ (acceleration due to gravity)}$$

