

Physics 111 Midterm exam equation sheet

Equations

Quadratic Equation:

The solutions of $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Equations of kinematics

$$x = v_{0x}t + \frac{1}{2}at^2$$

$$v = v_0 + at$$

$$v^2 = v_0^2 + 2ax$$

$$x = \frac{1}{2}(v + v_0)t$$

Projectile motion

$$y = v_{0y}t + \frac{1}{2}a_yt^2$$

$$x = v_{0x}t$$

$$v_y = v_{0y} + a_yt$$

$$v_x = v_{0x}$$

$$v_y^2 = v_{0y}^2 + 2a_yy$$

Newton's 2nd Law

$$\sum \vec{F} = m\vec{a}$$

$$\sum F_x = ma_x$$

$$\sum F_y = ma_y$$

Force of Friction

Static : $F_s \leq \mu_s F_N$

Kinetic : $F_k = \mu_k F_N$

Gravitation force

$$F_G = \frac{Gm_1m_2}{r^2}$$

Constants and unit conversion:

$$g = 9.8 \text{ m/s}^2$$

$$G = 6.67 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$$

$$1 \text{ foot} = 0.3048 \text{ m}$$

$$1 \text{ mile} = 1609 \text{ m}$$