

Physics 101

“Cheat Sheet”

Velocity and Acceleration

$$\Delta t = t_f - t_i, \quad \Delta x = x_f - x_i, \quad \Delta v = v_f - v_i. \quad etc.$$

$$v = \lim_{\Delta t \rightarrow 0} \frac{\Delta x}{\Delta t},$$

$$a = \lim_{\Delta t \rightarrow 0} \frac{\Delta v}{\Delta t}.$$

Constant acceleration

$$\Delta v = a\Delta t, \tag{0.1}$$

$$\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$$

Newton's laws of Motion

$$F_{\text{net}} = ma$$

$$F_{\text{on A due to B}} = -F_{\text{on B due to A}}.$$

Circular Motion

$$a_{\text{in}} = \frac{v^2}{r}.$$

Newton's law of Gravity

$$F_{\text{grav}} = G_N \frac{m_A m_B}{r^2}, \quad G_N = 6.7 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$$

Momentum and Energy

$$p = mv$$

$$E = \frac{1}{2}mv^2 + mgh + E_{\text{other}}$$

Electromagnetism

$$F_{\text{elec}} = k \frac{Q_A Q_B}{r^2}, \quad k = 9 \times 10^9 \text{ N} \cdot \text{m}^2/\text{Coul}^2$$

Bohr Atom

$$E_n = -\frac{2\pi^2 e^4 m_e k^2}{n^2 h^2}, \quad h = 6.7 \times 10^{-34} \text{ J} \cdot \text{s}$$