

Physics 10310 Exam #2 Formulas

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

$$|\vec{B}| = \sqrt{B_x^2 + B_y^2 + B_z^2} \quad \hat{i} = \hat{x}; \quad \hat{j} = \hat{y}; \quad \hat{k} = \hat{z} \quad \vec{v}_{A,C} = \vec{v}_{A,B} + \vec{v}_{B,C}$$

$$\text{Constant } a_x: \quad x = x_0 + v_{0,x}t + \frac{1}{2}a_x t^2 \quad v_x = v_{0,x} + a_x t \quad v_x^2 = v_{0,x}^2 + 2a_x(x - x_0)$$

$$\vec{v} = \frac{d\vec{r}}{dt} = v_x \hat{i} + v_y \hat{j} + v_z \hat{k} = \frac{dx}{dt} \hat{i} + \frac{dy}{dt} \hat{j} + \frac{dz}{dt} \hat{k} \quad \vec{a} = \frac{d\vec{v}}{dt} = a_x \hat{i} + \dots = \frac{dv_x}{dt} \hat{i} + \dots = \frac{d^2x}{dt^2} \hat{i} + \dots$$

$$at^2 + bt + c = 0 \rightarrow \quad t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}; \quad \sum \vec{F} = \vec{F}_{\text{tot}} = m\vec{a} = \frac{d}{dt} \vec{p}_{\text{tot}}$$

$$W_{\text{on object}} = \int \vec{F}_{\text{on object}} \cdot d\vec{s} \quad KE_{\text{lin}} = \frac{1}{2}mv^2 \quad \Delta KE = W$$

$$F_{x, \text{ spring}} = -kx \quad W_{\text{spring}} = -\frac{1}{2}kx^2 \quad \text{circular motion: } F_{\text{in}} = \frac{mv^2}{r}$$