

PHYS2210 - SP2021 - Formula Card

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February 13, 2021

Constant Acceleration

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

$$v = v_0 + a t$$

$$v^2 = v_0^2 + 2a(x - x_0)$$

Free Fall

$$y = y_0 + v_{0y} t + \frac{1}{2} g t^2$$

$$v_f = v_{0y} - g t$$

$$v_f^2 = v_y^2 - 2g(y - y_0)$$

Vectors with angles

$$A_x = A \cos \theta$$

$$A_y = A \sin \theta$$

$$\tan \theta = \frac{A_y}{A_x}$$

$$\theta = \arctan \frac{A_y}{A_x}$$

Angular Velocity

$$s = r \theta$$

$$v = r \omega$$

$$\omega = \frac{d\theta}{dt} = \frac{2\pi}{T}$$

$$v = \frac{2\pi r}{T}$$

$$T = \frac{2\pi r}{v}$$

Kinematics of Constant Angular Acc.

$$s = s_0 + v_0 t + \frac{1}{2} a t^2 \equiv \theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2$$

$$v^2 = v_0^2 + 2a(s - s_0) \equiv \omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$$

$$a_c = \frac{v^2}{r}$$

$$a_r = \omega^2 r$$

$$v_{ang} = \frac{r}{T}$$

$$a_{ang} = \frac{v_{ang}}{T}$$

Kinetic Friction

$$a = \frac{f_{net}}{m}$$

$$\overrightarrow{F_{net}} = \sum \overrightarrow{F} = m \overrightarrow{a}$$

$$F = ma$$

$$F_k = \mu_k n$$

$$n = mg$$