PHYS2210 - SP2021 - Formula Card

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Constant Acceleration

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

$v = v_0 + at$

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

Free Fall

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

$v_f = v_{0y} - gt$

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

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.

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

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

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

$a_r = \omega^2 r$

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

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

Kinetic Friction

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

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

$F = ma$

$F_k = \mu_k n$

$n = mg$