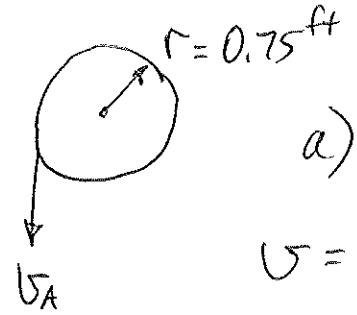
PROB. 15-28

$v_{A,0} = 9 \frac{ft}{s}$, $\Delta y_A = 18^{ft}$, $\omega_f = 0$

UNIFORMLY ACCELERATED MOTION




a) FIND $\alpha$

$v = r\omega$, $\omega = \frac{v}{r}$, $\omega_0 = \frac{v_{A,0}}{r} = \frac{(9 \frac{ft}{s})}{(0.75^{ft})}$

$\omega_0 = 12 \frac{RAD}{s}$

$s = r\theta$, $(\theta - \theta_0) = \frac{s}{r} = \frac{(18^{ft})}{(0.75\,ft)} = 24^{RAD}$

$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$

$\alpha = \frac{\omega^2 - \omega_0^2}{2(\theta - \theta_0)} = \frac{0 - (12 \frac{RAD}{s})^2}{2(24^{RAD})} = \boxed{-3.0 \frac{RAD}{s^2} \circlearrowleft}$

b) FIND $t$

$\omega = \omega_0 + \alpha t$

$t = \frac{\omega - \omega_0}{\alpha} = \frac{0 - (12 \frac{RAD}{s})}{(-3.0 \frac{RAD}{s^2})} \boxed{= 4.0^s}$