

SP12-1) a) $\omega = \frac{v}{r} = \frac{45 \text{ m/s}}{250 \text{ m}} = 0.18 \text{ rad/s}$

b) $a_t = 0$ since $\omega = \text{constant}$.

$a_r = \frac{v^2}{R} = \frac{(45 \text{ m/s})^2}{250 \text{ m}} = 8.1 \text{ m/s}^2 //$

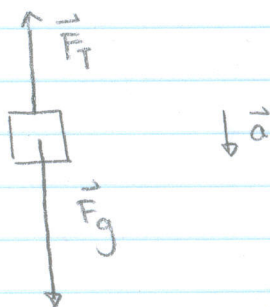
towards the centre of the circular track.

(SP12-3) $\tau_{\text{net}} = 0$.

$r_1 F_1 = r_2 F_2$

$F_2 = \frac{r_1 F_1}{r_2} = \frac{(0.87 \text{ m})(125 \text{ N})}{(0.53 \text{ m})} = 205 \text{ N} //$

(SP12-4) a)



b) $mg - F_T = ma$.

$F_T = mg - ma \approx mg$ for $a \ll g$.

c) $\tau = r_s F_T \approx r_s mg$

d) $\alpha = \frac{a}{r_s}$

e) $\tau = I\alpha$

$I = \frac{\tau}{\alpha}$

f) $I_d = \frac{1}{2} M r_d^2$ (from activity guide)