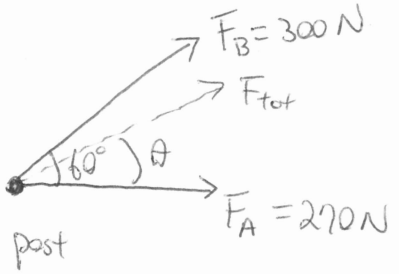
HW #2

Ch.4 #5



$F_A = 270\hat{\imath} + 0\hat{\jmath}\ N$

$F_B = 300\cos 60\,\hat{\imath} + 300\sin 60\,\hat{\jmath}\ N$

$= 150\hat{\imath} + 260\hat{\jmath}\ N$

$F_{Tot} = F_A + F_B = 420\hat{\imath} + 260\hat{\jmath}\ N$

$\tan\theta = \frac{260}{420} \Rightarrow \boxed{\theta = 32°}$

$|F_{tot}| = \sqrt{420^2 + 260^2} = \boxed{494\ N}$

Ch.4 #9

$F = ma$

$48.0\ N = m(3.00\ m/s^2)$

$\boxed{m = 16.0\ kg}$

Ch.4 #36

$100\ g \cdot \frac{1\ kg}{1000\ g} = 0.1\ kg$

$\Delta y = v_0 t + \frac{1}{2}at^2$

$10.0\ m = \frac{1}{2}a(2.2)^2$

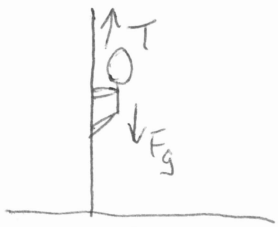
$10.0 = 2.42a$

$a = 4.1\ m/s^2$

$F = ma = 0.1(4.1)$

$= \boxed{0.41\ N}$

Ch.4 #49



a) $a = 0$

$F_{tot} = 0 = T + F_g$

$\boxed{T = -F_g}$

b) $a = 0 \Rightarrow \boxed{T = -F_g}$

c) $ma = T + F_g$

$T = ma - F_g = ma - mg$

$T = m(a - g)$

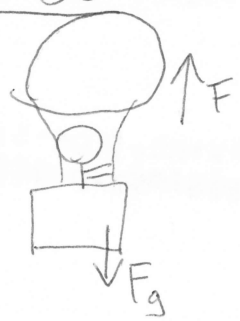
$T = m(a - (-9.8))$

$\boxed{T = m(a + 9.8)}$

d) $m(-a) = T + F_g$

$\boxed{T = m(-a + 9.8)}$

Ch.4 #56

a) 

b) $F_{tot} = m(g/3) = F + F_g$

$\frac{mg}{3} = F + mg$

$F = -\frac{2mg}{3} = m(-\frac{2}{3})(-9.8)$

$\boxed{F = 6.5m}$

c) F_{tot} needs to be $m(g/2)$ upwards.

$F_{tot} = F + F_g$

$(-m\,g/2) = 6.5\,M_{tot} + mg$

$-\frac{3mg}{2} = 6.5\,M_{tot}$

$m = (-\frac{2}{3g})\,6.5\,M_{tot}$

[illegible] M_{tot}

$m = (-\frac{2}{3})(\frac{1}{-9.8})\,6.5\,M_{tot}$

$m = 0.44\,M_{tot}$

Final mass needs to be $0.44\,M_{tot}$

so he needs to shed $M_{tot} - 0.44\,M_{tot}$

$= \boxed{0.56\,M_{tot}}$