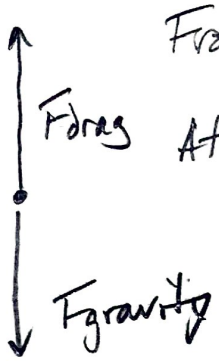
6.79 Find $v_{Terminal}$ for headfirst skydiver w/ $m = 80.0\ kg$ & $A = 0.140\ m^2$

Drag force $R = F_{Drag} = \frac{1}{2} C \rho A v^2$

From info in back $C_{skydiver\ vertical} = 0.70$, & $\rho = 1.21\ kg/m^3$



At $v_{Terminal}$, $a = 0$, so $\Sigma F = ma = 0$

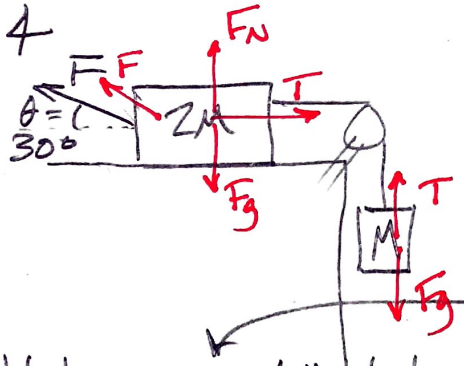
$F_g - F_{Drag} = 0$

$mg = \frac{1}{2} C \rho A v^2$

$(80)(9.8) = \frac{1}{2}(0.7)(1.21)(0.140) v^2$

$v = \boxed{115\ m/s}$

6.94



F = 60.0N & M = 4.00kg. Find acceleration of mass M (surface is frictionless).

Long version? or shortcut?

$\Sigma F = ma$

$F\cos 30 - Mg = ma$

$60\cos 30 - (4)(9.8) = 12a$

$a = 1.06\ m/s^2$ up.

2M block

$\Sigma F = ma$

$T - F_{//} = 2Ma$

$T - F\cos 30 = 2Ma$

$T = 2(4)a + 60\cos 30$

$= 8a + 51.96$

1M block

$\Sigma F = ma$

$Mg - T = Ma$

$(4)(9.8) - (8a + 51.96) = 4a$

$39.2 - 8a - 51.96 = 4a$

$-12.76 = 12a$

$a = 1.06\ m/s^2$

The negative for my chosen direction means the mass is accelerating up.