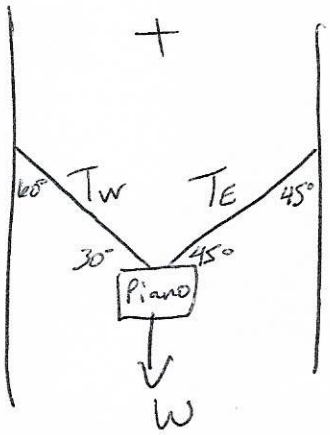
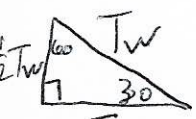
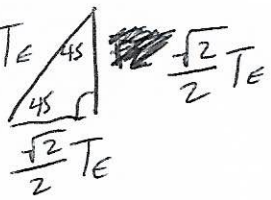
6.



$F_{net_y} = 0 = T_{W_y} + T_{E_y} - w = 0 \quad w = T_{W_y} + T_{E_y}$

$F_{net_x} = 0 = T_{E_x} - T_{W_x} \quad T_{E_x} = T_{W_x}$





$\frac{\sqrt{2}}{2}T_E = \frac{\sqrt{3}}{2}T_W$

$T_E = \left(\sqrt{\frac{3}{2}}\right)T_W$

$w = T_{W_y} + T_{E_y}$

$w = \frac{1}{2}T_W + \frac{\sqrt{2}}{2}\left(\sqrt{\frac{3}{2}}\right)T_W$

$w = \frac{1}{2}T_W + \frac{\sqrt{3}}{2}T_W$

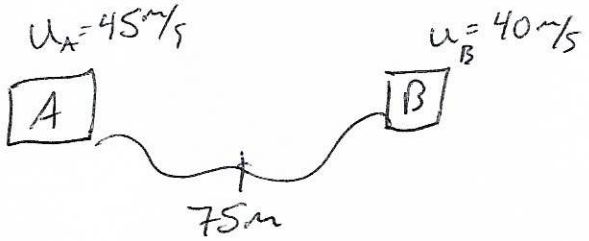
$T_W = \frac{w}{\left(\frac{1}{2}+\frac{\sqrt{3}}{2}\right)} = \frac{mg}{\left(\frac{1}{2}+\frac{\sqrt{3}}{2}\right)}$

$\boxed{T_W = 0.73\,mg}$

$T_E = \sqrt{\frac{3}{2}}(.73\,mg)$

$\boxed{T_E = 0.89\,mg}$

7.



$t_T = t_r + t_s$

$\frac{150}{85}s - \frac{5}{3}s = t_r$

$\boxed{t_r = 9.8\times10^{-2}\,s}$

$V = u + at$

$\frac{V-u}{a} = t_a$

$\frac{40\,m/s - 45\,m/s}{-3\,m/s^2} = t_a$

$\frac{-5}{-3} = t_a$

$t_a = \frac{5}{3}s$

$S = \frac{(u+V)\,t}{2}$

$\frac{2S}{(u+V)} = t_T$

$\frac{2(75m)}{(45\,m/s + 40\,m/s)} = t_T$

$t_T = \frac{150}{85}\,s$