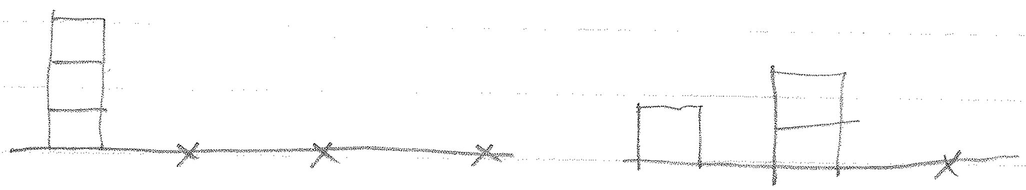
Pg 147-148: 26, 28b, 35, 39, 43a&b, 62

26. $K_i + U_{gi} + U_{si} + W = K_F + U_{gF} + U_{sF}$



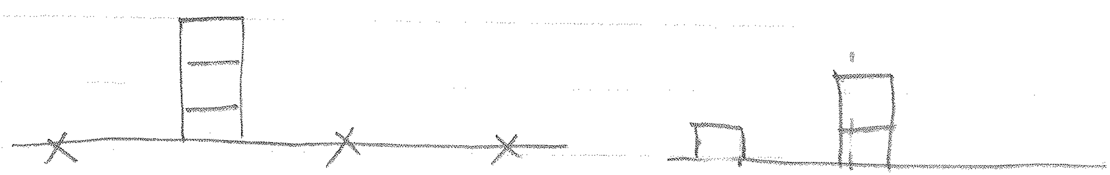
$K_i = K_F + U_{gF}$

$\hookrightarrow \frac{1}{2}m\vec{v}_i^2 = \frac{1}{2}m\vec{v}_F^2 + mgh$

$\hookrightarrow h = \dfrac{\frac{1}{2}m\vec{v}_i^2 - \frac{1}{2}m\vec{v}_F^2}{m \cdot g} = \dfrac{\frac{1}{2}(50kg)(10m/s)^2 - \frac{1}{2}(50kg)(1.0m/s)^2}{(50kg \cdot 10m/s^2)}$

$h = 5.0m$

28b. $K_i + U_{gi} + U_{si} + W = K_F + U_{gF} + U_{sF}$



$U_{gi} = K_F + U_{gF}$

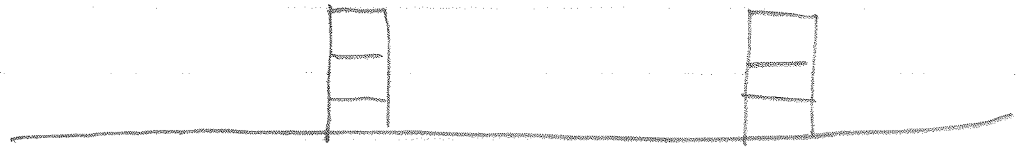
$\hookrightarrow mgh_i = \frac{1}{2}m\vec{v}_F^2 + mgh_F$

$\hookrightarrow \sqrt{\dfrac{mgh_i - mgh_F}{\frac{1}{2}m}} = \vec{V}_F = \sqrt{\dfrac{.400kg \cdot 10m/s \cdot 5.00m - .400kg \cdot 10m/s \cdot 2.00m}{\frac{1}{2}(.400kg)}}$

$\rightarrow \vec{V}_F = +7.75m/s$

35.)

$K_i \quad U_{g_i} \quad U_{s_i} \quad W = K_f \quad U_{g_f} \quad U_{s_f}$



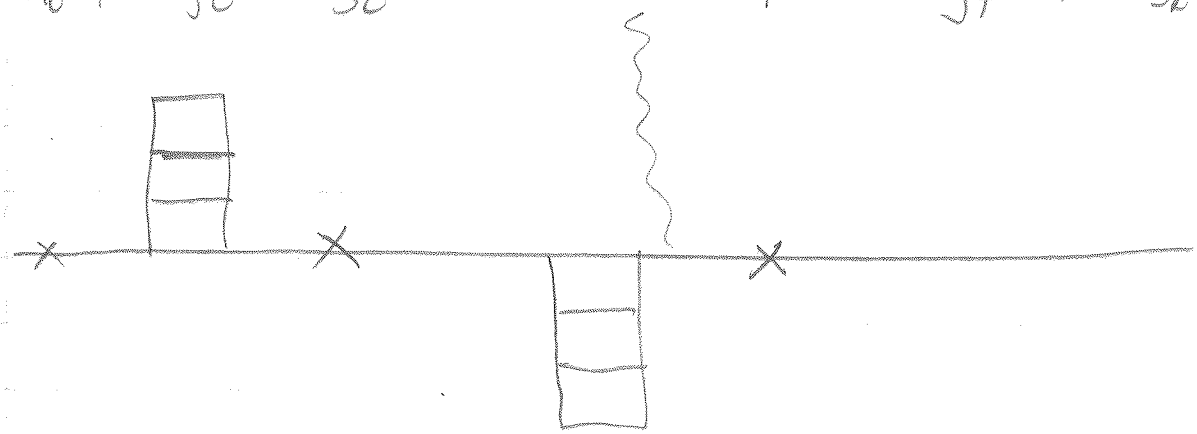
$U_{s_i} = U_{g_f}$

$\frac{1}{2}kx^2 = mgh$

$\frac{\frac{1}{2}kx^2}{mg} = h = \frac{\frac{1}{2}(5.00\times10^3\,N/m)(.100m)^2}{(.250kg \cdot 10m/s^2)}$

$h = 10m$

39a) $K_i + U_{gi} + U_{si} + W = K_F + U_{gF} + U_{sF}$



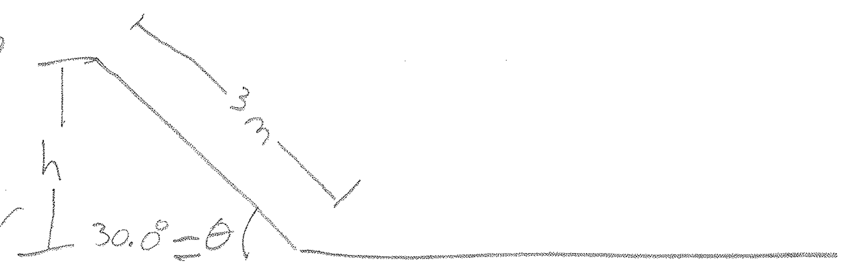
$U_{gi} + W = 0J$

→ $mgh + \vec{F}d = 0J$

→ $\vec{F} = \frac{mgh}{d} = \frac{70kg(10m/s^2)(15m)}{5.0m}$

$\vec{F} = +2100N$

43a,b



→ $h \to \sin 30.0° = \frac{h}{3m} = h = \sin 30.0° \cdot 3m$

a) $K_i + U_{gi} + U_{si} + W = K_F + U_{gF} + U_{sF}$

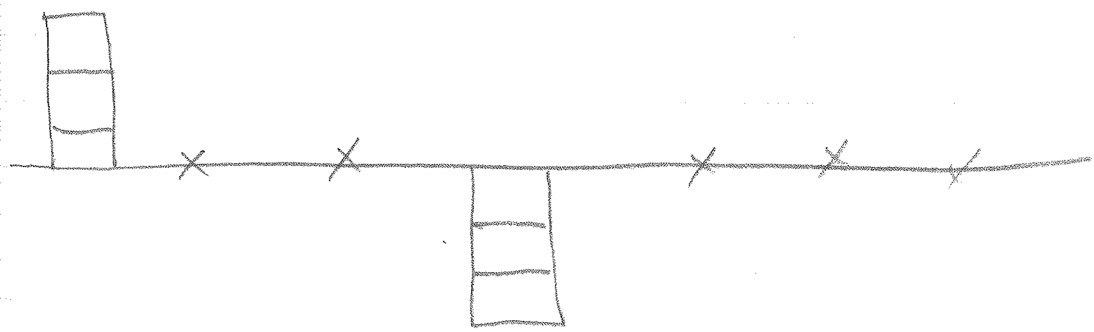
→ if $\vec{F}_F$ is not present on ramp, no need for W.

→ $\vec{U_{gi}} = \vec{K_F} \to mgh = \frac{1}{2}mv_F^2 \to \vec{V_F} = \sqrt{\frac{mgh}{\frac{1}{2}m}} = \sqrt{\frac{10.0kg \cdot 10m/s^2 \cdot 1.5m}{\frac{1}{2}(10.0kg)}}$

$\vec{V_F} = 5.5m/s$

43b) Showing bar charts for the block sliding from bottom of ramp to rest.

$K_i \quad U_{g_i} \quad U_{s_i} \quad W \quad = \quad K_F \quad U_{g_F} \quad U_{s_F}$



$K_i + W = 0\,J$

$\hookrightarrow \frac{1}{2} m \vec{v}_i^{\,2} + \vec{F} \cdot d = 0\,J$

$\hookrightarrow \frac{1}{2} m \vec{v}_i^{\,2} + \mu \cdot m \cdot g \cdot d = 0\,J$

$\vec{V_i} = \vec{V_F}$ from part a

$\hookrightarrow \mu = \frac{-\frac{1}{2} m \vec{v}_i^{\,2}}{m \cdot g \cdot d} = \frac{-\frac{1}{2}(10.0kg)(5.5 m/s)^2}{(10.0kg)(10 m/s^2)(5.00m)}$

$\mu = .3025$

(2) $K_i \quad U_{g_i} \quad U_{s_i} \quad W \quad = \quad K_f \quad U_{g_F} \quad U_{s_F}$

$U_{s_i} + \vec{F} \cdot d = K_F$

$\hookrightarrow \frac{1}{2} k x^2 + \vec{F} \cdot d = \frac{1}{2} m \vec{v}_F^{\,2}$

$\hookrightarrow \vec{V}_F = \frac{\frac{1}{2} k x^2 + \vec{F} \cdot d}{\frac{1}{2} m} = \sqrt{\frac{\frac{1}{2}(8.0 N/m) .05m^2 + (.032N \cdot .15m)}{\frac{1}{2}(.053kg)}}$