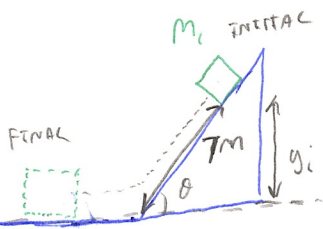
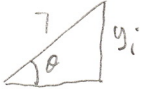


ENERGY: COE - FUNDAMENTAL EXAMPLE SOLUTIONS

(1)



$U_i^g = 0$



$7 \sin \theta = y_i$

$y_i = 3.5 \text{ m}$

$\cancel{KE_i} + U_i^g + \cancel{\sum W^{nc}} = \cancel{KE_f} + U_f^g$

$U_i^g = KE_f$

$mgy_i = \frac{1}{2} m v_f^2$

$v_f = \sqrt{2gy_i}$

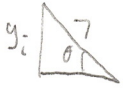
$v_f = \sqrt{(2)(9.8)(3.5)}$

$v_f \approx 8.3 \text{ m/s}$

(2)



$U_i^g = 0$



$7 \sin \theta = y_i$

$y_i \approx 4.5 \text{ m}$

EQ. POSITION

$x=0$

$\Delta x_f$

MAX COMPRESS

$\vec{v} = \vec{0}$

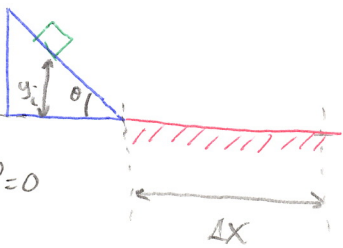
$\cancel{KE_i} + U_i^g + \cancel{U_i^s} + \cancel{\sum W^{nc}} = \cancel{KE_f} + U_f^g + U_f^s$

$U_i^g = U_f^s$

$mgy_i = \frac{1}{2} k \Delta x_f^2$

$\Delta x_f = \sqrt{\frac{2mgy_i}{k}} = \sqrt{\frac{2(7)(9.8)(4.5)}{1900}} \approx 0.57 \text{ m}$

(3)



$U_i^g = 0$

$7 \sin \theta = y_i$

$y_i \approx 2.4 \text{ m}$

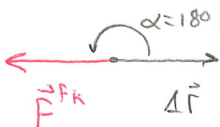
$\cancel{KE_i} + U_i^g + \cancel{\sum W^{nc}} = \cancel{KE_f} + U_f^g$

$U_i^g + W^{FK} = 0$

$W^{FK} = \vec{F}^{FK} \cdot \Delta \vec{r}$

$W^{FK} = |\vec{F}^{FK}| |\Delta \vec{r}| \cos(\alpha)$

VECTOR OP...



$W^{FK} = |\vec{F}^{FK}| |\Delta \vec{r}| \cos(180)$

$W^{FK} = -\mu_k |\vec{F}^n| |\Delta \vec{r}|$

$W^{FK} = -\mu_k mg \Delta x$

$U_i^g - \mu_k mg \Delta x = 0$

$mgy_i - \mu_k mg \Delta x = 0$

$\Delta x = \frac{y_i}{\mu_k} \approx \frac{2.4}{0.2} \approx 12 \text{ m}$