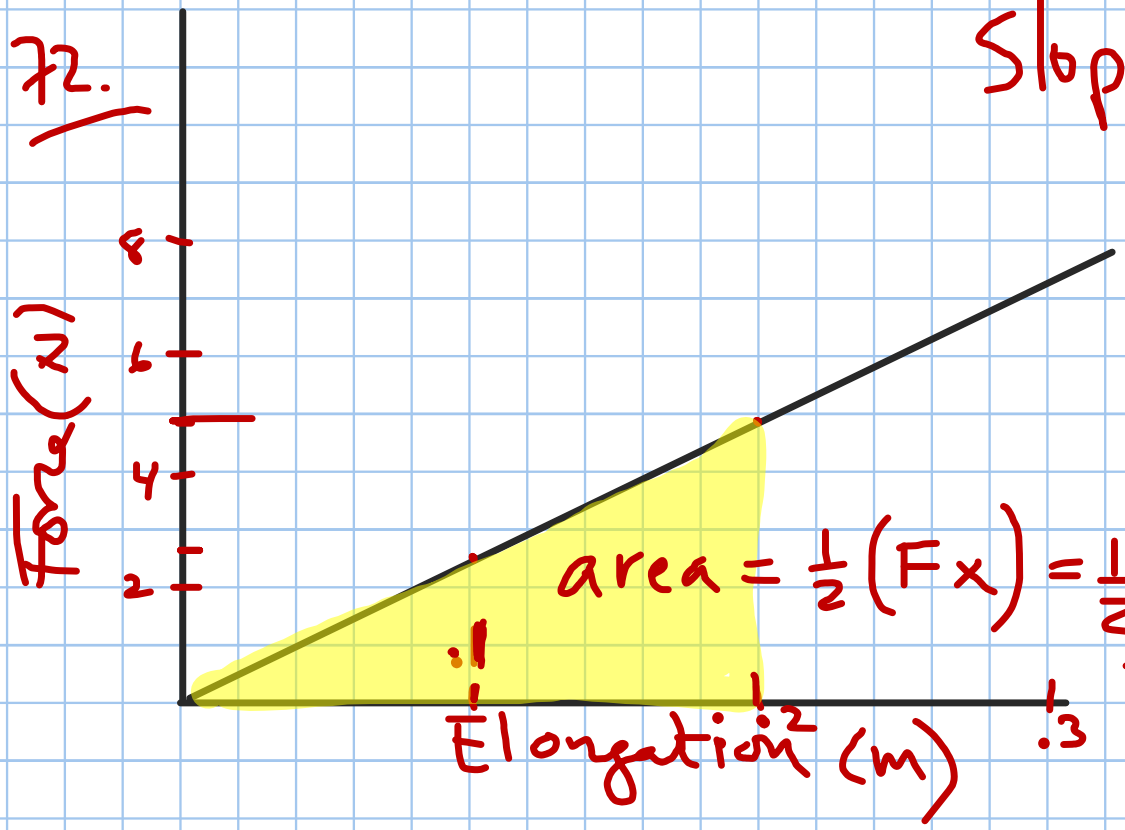
P. 280 #72, 73, 74 in text

72.



Slope = $\frac{\text{rise}}{\text{run}}$ = Spring Constant

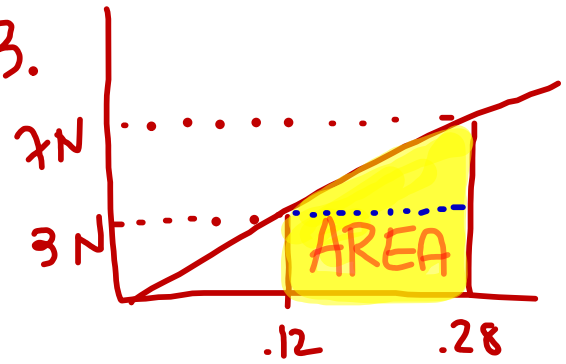
area = $\frac{1}{2}(Fx) = \frac{1}{2}(5N)(.2m)$
$= .5\,J$

Area = Nm = J
ENERGY

Spring Energy $PE_s = \frac{1}{2}kx^2$

$= \frac{1}{2}\left(25\frac{N}{m}\right)(.2m)^2 = .5\,Nm$

73.



$\text{Area}_1 = 3N(.16m) = .48\,Nm$

$\text{Area}_2 = \frac{1}{2}(4N)(.16m) = .32\,Nm$

TOTAL AREA = $.80\,Nm$

By formula Work done = ΔPE_s

$k = 25\frac{N}{m}$

$= \frac{1}{2}kx_2^2 - \frac{1}{2}kx_1^2$

$= \frac{1}{2}k\left(x_2^2 - x_1^2\right)$

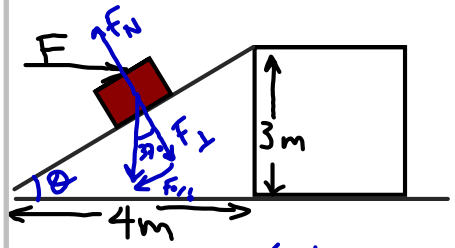
$= \frac{1}{2}\left(25\frac{N}{m}\right)\left[(.28m)^2 - (.12m)^2\right]$

$\Delta PE_s = \frac{1}{2}\left(25\frac{N}{m}\right)\left(.064\,m^2\right)$

$= .80\,Nm = \text{Work done}$

74. $F_g = 93N$ crate

$F_A = 85N$ in x



$F_x d_x = 85N(4m) = 340J$

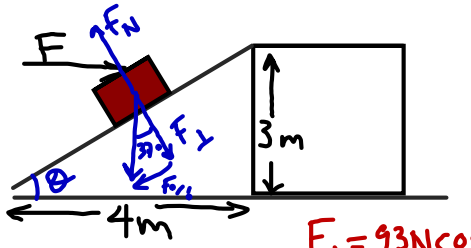
$\Delta PE = (mg)\Delta h = (93N)(3m)$ (F (d))

$\Delta PE_{grav} = 279J$

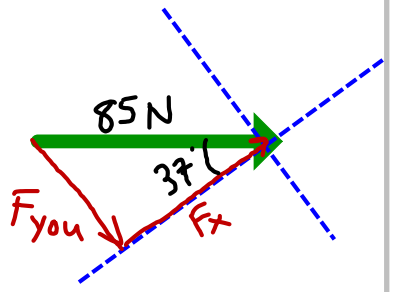
$\theta = ?$ $\tan^{-1}\left(\frac{3}{4}\right) = \theta = 37°$

$\mu_K = .20$ sliding coeff. friction

$$W = \mu F_N d = \mu \left(F_{\text{Force down on plane}} + F_{\perp} \right) d$$



$F_{\perp} = 93N \cos 37° = 74.3N$



$F_{you} = F_N \sin 37°$

$= 85N \sin 37°$

$F_{you} = 51.2N$

$W = \mu \left(F_{you} + F_{\perp} \right) d$

$= .2(51.2N + 74.3N)(5m)$

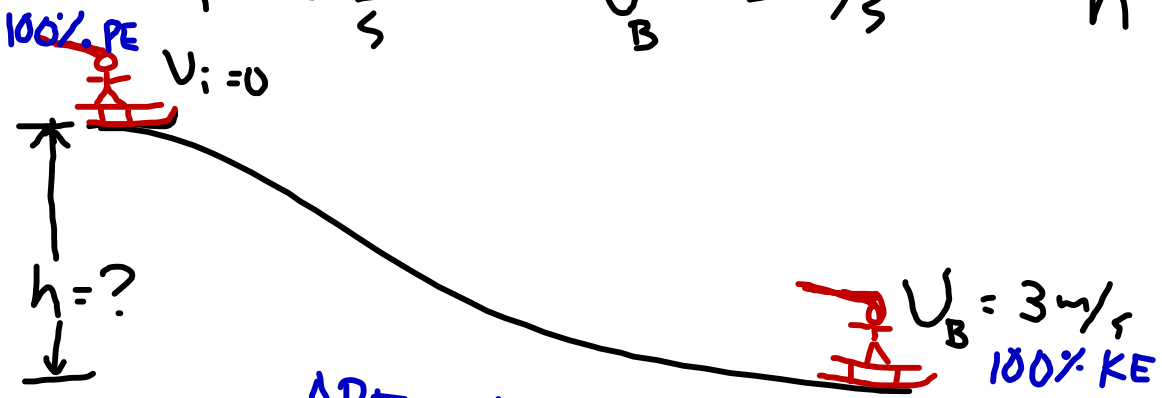
$= 125.5J$

#27,28 in packet

27. A child + sled $m_T = 50\,kg$

Slide down frictionless slope

$v_i = 0\ \frac{m}{s}$ $\quad v_B = 3\ m/s$ $\quad h = ?$

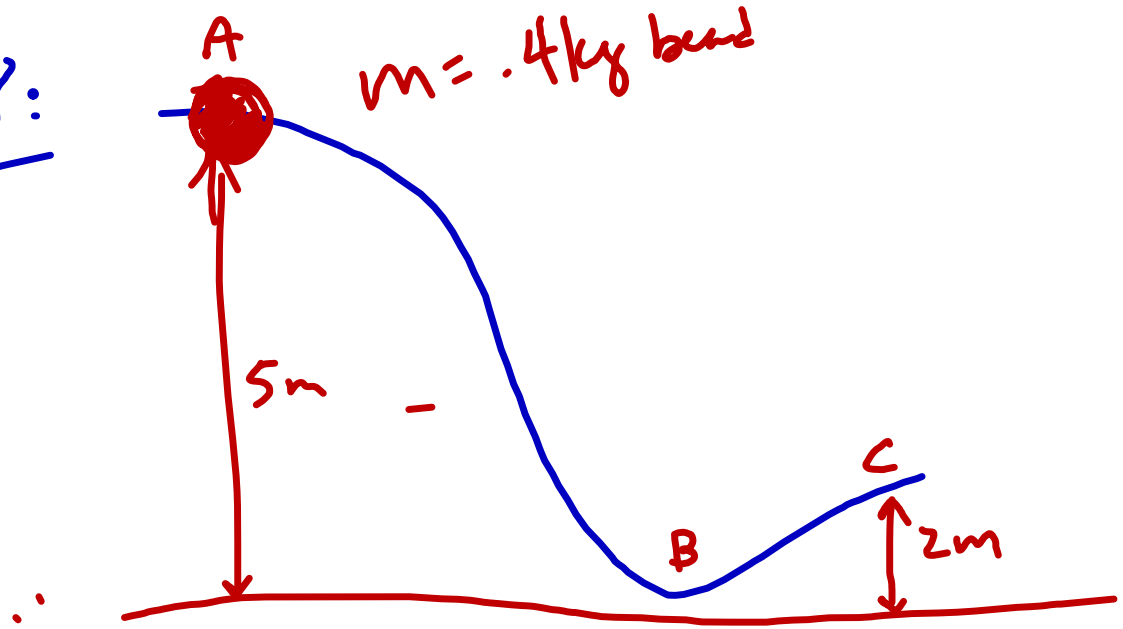


$\Delta PE = \Delta KE$

$mg\Delta h = \frac{1}{2}mv^2$

$\Delta h = \frac{v^2}{2g} = \frac{(3\ m/s)^2}{2(9.8\ m/s^2)} = .46\ m$

28:



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