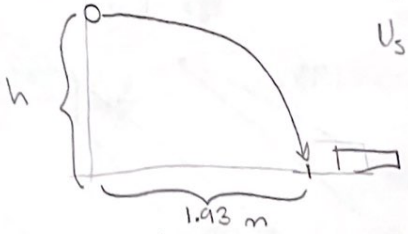
Gabriella Polin - SW Problems

Question 9

$F_s = -kx$

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

Bobby's attempt:



$d = 2.2 - .27 = 1.93$ m

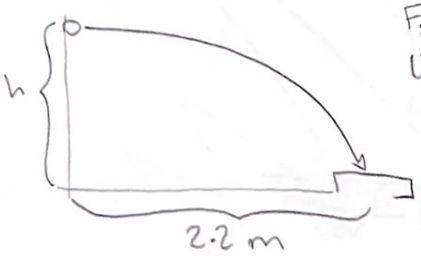
$F_s = k(.011)$

$U_s = \frac{1}{2}k(.011)^2 = .000061k$

$E_F = E_i + G - L$

$\frac{1}{2}mv_f^2 = \frac{1}{2}k(.011)^2 + mgh$

Rhoda's attempt:



$F_s = -kx$

$U_s = \frac{1}{2}k(x)^2$

$\frac{1}{2}mv_f^2 = \frac{1}{2}k(.011)^2 + mgh$

$\frac{1}{2}m(38.625) = \frac{1}{2}k(.011)^2 + m(10)(-1)$

$9.312\,m = .000061k$

Say $m = 1$ kg

$153921 = k$

$F_s = (153921)(.011) = 1693.14$ N

$\frac{2.2}{1.93} = 1.1399$ times further to hit box

$1.1399F_s = 1930$

$\frac{1930}{k} = .012539\,m = -x$

1.2539 cm

Hypothetically, if h was 1 m:

Bobby's attempt:

$v_{fy}^2 = v_{iy}^2 + 2a_y\Delta y$

$v_{Fy}^2 = 2(-10)(-1)$

$v_{Fy} = v_{iy} + a_y t$

$\frac{-\sqrt{20}}{-10} = t = .447$

$v_F = \sqrt{4.3156^2 + 20}$

$v_F = 6.21486$

	x	y
Δ	1.93	-1
v_i	4.3156	0
v_f	4.3156	$-\sqrt{20}$
a	0	-10
t	.447	

$\Delta x = v_{ix}t + \frac{1}{2}a_x t$

$\frac{\Delta x}{t} = v_{ix} = v_{fx} = 4.3156$