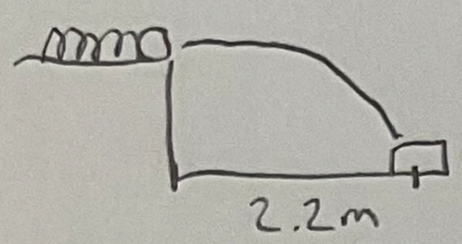
Cole Garrett FRQ 1



spring compressed 1.1 cm
and is 27 cm short

$2.2 - .27 = 1.93$

$\frac{.011}{1.93} = \frac{x}{2.2}$ $x = 1.25$ cm

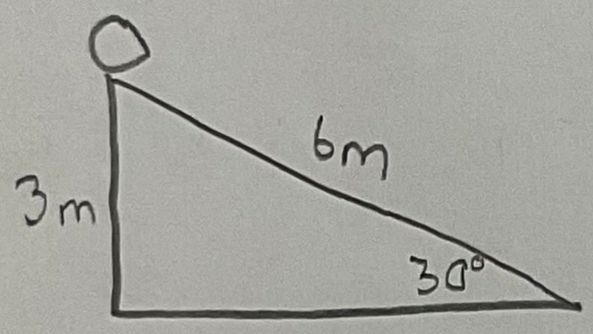
$F = -kx$

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

FRQ 2

Uniform Cylinder $R = .2m$ $m = 2kg$ $g = 10\ m/s^2$ $I = \frac{1}{2}MR^2$

$KE_R = \frac{1}{2}Iw^2$



a. Linear Accel

b. Rotational KE at bottom

$ma = mg\sin 30$

$a = 10 \cdot \sin 30$

$a = 5\ m/s^2$

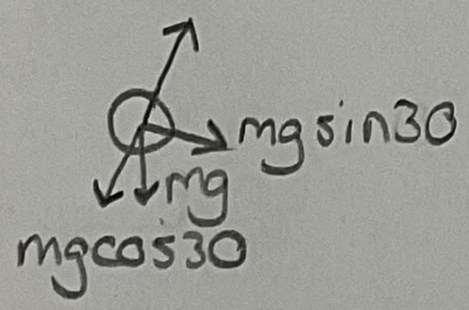
$v_f^2 = v_i^2 + 2ax$

$v_f^2 = 2(5)(6)$

$v_f = 7.75$

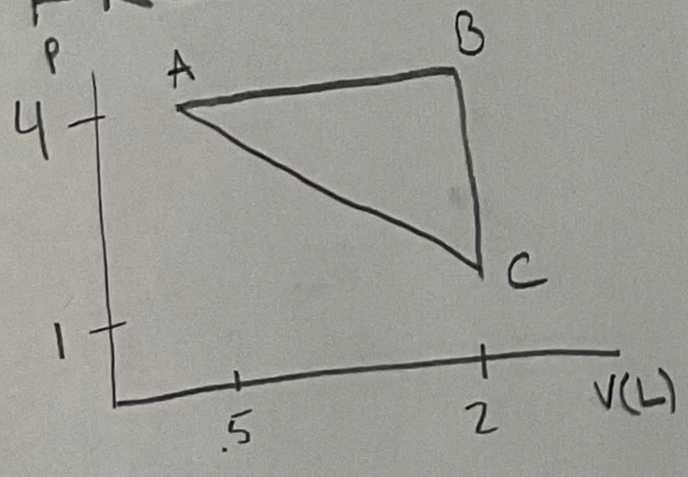
$w = \frac{v}{r}$

$w = 38.73$



$KE_R = \frac{1}{4}MR^2w^2 = \frac{1}{4}(2)(.2)^2(38.73)^2 =$ 30J

FRQ 3 $T_c = 300K$ monoatomic ideal gas



$\frac{3}{2}nRT$

FRQ 4 $d = 10.8$ light-years $v = .3c$ $c = 3 \times 10^8$

$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$ $\gamma = 1.048$

$a = 37.74$ years

$b = 36$ years