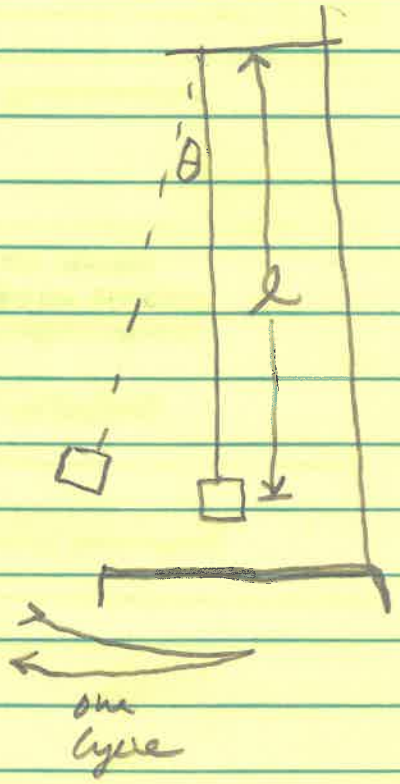
SHM FR

1) a. The period of a pendulum is 2π times the square root of the length of pendulum divided by the square root of the acceleration of gravity

b. Period of one Cycle — T — Stopwatch

Length of Pendulum — l — Meterstick

1) Set up pendulum
2) Measure l from pivot point to center of mass
3) Set pendulum in motion by raising mass $\theta = 2^\circ$ from center
4) Use timer to see how long it takes mass to make one cycle (T)
5) Repeat for different lengths of l.
6) Graph T^2 vs $4\pi^2 l$
   Find slope and find its reciprocal. This is g



d. the sphere will displace downward with zero initial velocity and a downward acceleration equal to g.

c. i. $V_{vert} = T^2$ Horizon $= 4\pi^2 l$

ii. $m = \frac{1}{g}$ so $\frac{1}{m} = g$

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2) a. $U_s = \frac{1}{2}kx^2$

$10 = \frac{1}{2}k(.25)^2 \quad k = 320\ N/m$

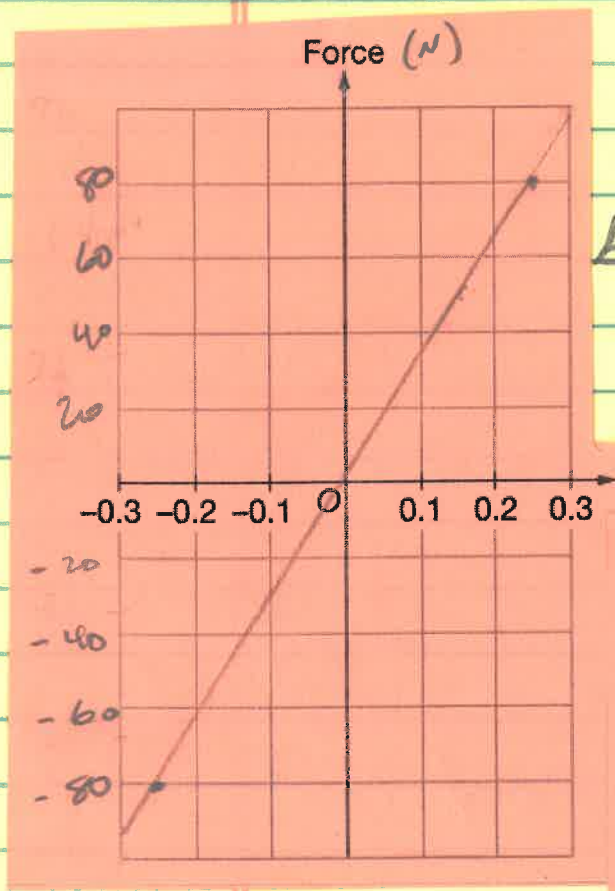
graph $F = kx$ or $F = (320)x$ See graph A

b. $T = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{.4}{320}} = .222\ sec$

c. $PE = KE$ at $x = .25$ at $x = 0$ $\quad \frac{1}{2}kx^2 = KE$

$\frac{1}{2}(320)(.25)^2 = 10\ J$

See graph B



Graph A

Graph B