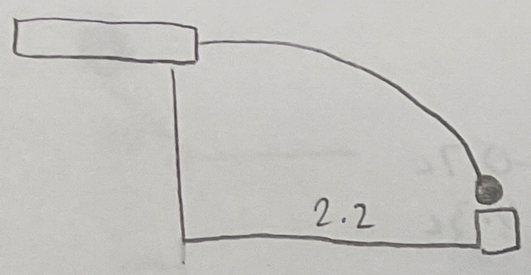
Alaina Harris

Question 9



$x = 2.2\,m$

$\Delta x_{spring} = 0.011\,m$

$\hookrightarrow x = 0.27\,m$

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

$KE = \frac{1}{2}mv^2$

$U_g = mgy$

$\Delta x_{spring} = ?$

$K_i + U_{gi} + U_{si} = K_f + U_{gf}$

$K_i^{(0)} + U_{gi} + U_{si} = K_f + U_{gf}^{(0)} + U_{sf}^{(0)}$

$U_{gi} + U_{si} = K_f$

$mgy_i + \frac{1}{2}kx^2 = \frac{1}{2}mv^2$

$\frac{1}{2}kx^2 = \frac{1}{2}mv_f^2 - mgy$

$x^2 = \frac{1}{2}k\left(\frac{1}{2}mv_f^2 - mgy\right)$

$x = \sqrt{\frac{1}{2}k\left(\frac{1}{2}mv_f^2 - mgy\right)}$