[mex277] Bouncing ball

A ball of mass m, when dropped from height h above a hard floor, bounces elastically back to the original height and continues to undergoes an anharmonic periodic motion. Its potential energy is well approximated by (i) gravitational potential energy with $g = \text{const}$ for $y > 0$ and (ii) elastic potential energy with stiffness k for $y < 0$.
Find the period τ of the bouncing motion as a function of h.

Solution: