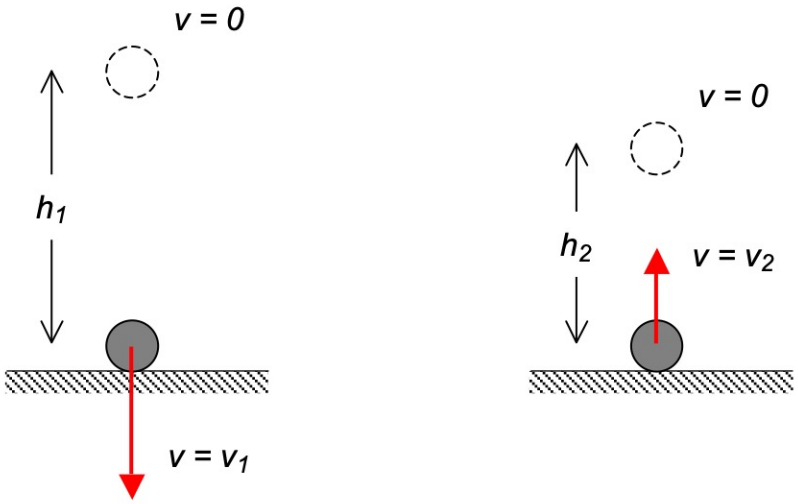
Homework H.4.M

Given: A particle of mass m is dropped from rest when at a height h_1 above a rigid floor. The particle impacts the floor with a speed of v_1. This impact of the particle with the floor lasts for a short duration of time Δt, and after the impact is complete, the particle rebounds upward with a speed of v_2. The particle continues upward reaching a maximum height of h_2.

Find: For this problem:
(a) Determine the average force acting on the particle by the floor during impact in the presence of gravity;
(b) Determine the average force acting on the particle by the floor during impact in the absence of gravity;
(c) Compare your answers from (a) and (b);
(d) Determine the value of h_2/h_1.



Use the following parameters in your analysis: $\Delta t = 0.002$ s, $m = 15$ kg, $v_1 = 80$ m/s and $v_2 = 50$ m/s.