GOALLESS PROBLEMS

A goalless problem is a scenario in which you are given information about some physical situation, then ask to deduce as much additional information as possible.

The idea is to use all the tools at your disposal—kinematics, Newton's Laws and all that that entails (N.S.L., the relationship between frictional and normal forces, the idea of centripetal acceleration, etc.), energy considerations and all that that entails (work calculations, the work/energy theorem, potential and kinetic energy calculations, the conservation of energy, etc.) and momentum considerations with all that that entails (impulse, conservation of momentum calculations, etc.).

The object is to accumulate information, and to do it in as many ways possible (that is, if you can determine the velocity of a body using kinematics, try using conservation of energy to see if you get the same result . . .). You can make graphs that show trends (example: how does the kinetic energy and potential energy play off one another, relative to the total mechanical energy, all as a function of time . . . or position . . .). You can present your results any way you want (though boxing is always good). This is the wild west of problem-solving.

Here is your problems:

Problem 2:

A block of mass $m_1 = 3.0$ kg sits stationary on the flat just in front of a frictionless, 30° incline. A second mass $m_2 = 2.0$ kg moving with velocity $v = 3.5$ m/s strikes the first mass and bounces off with rebound speed of .25 m/s.