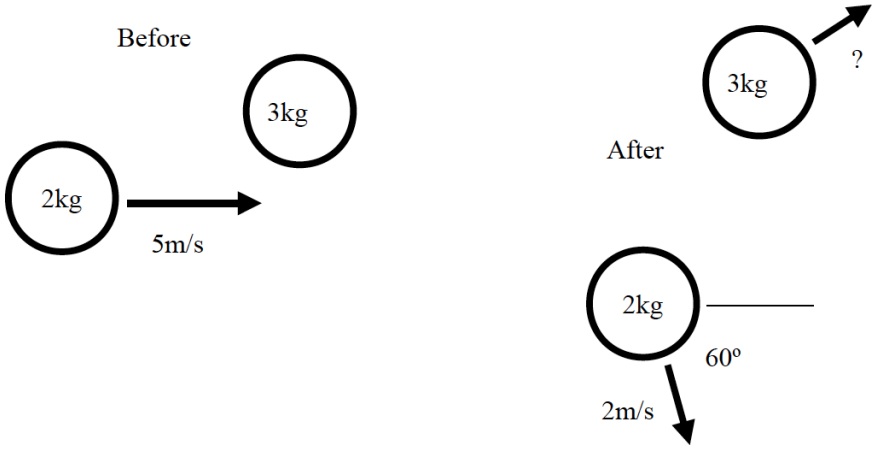
Homework Due April 11, 2013

Question 1
Impulse J = Ft = mΔv
4. A student driver steps on the gas pedal of an 1100 kg automobile applying a force of 600 N for 5 seconds. Determine the impulse and change in velocity of the auto.

Question 2 (Difficult question. Hint: solve into x-y components)

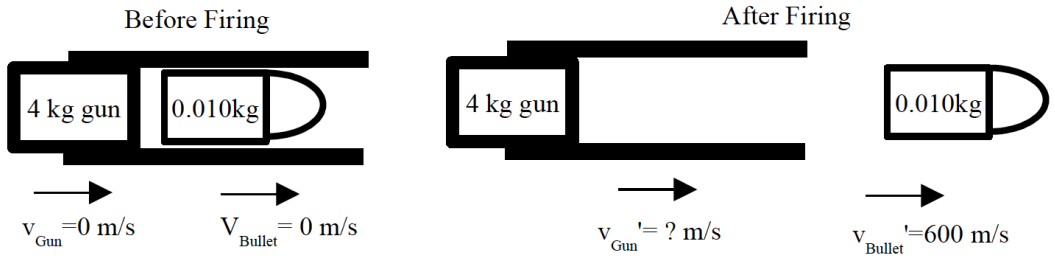
A 2kg puck sliding in the x-direction on a frictionless horizontal surface at 5m/s strikes a 3kg puck. After the collision, the 2kg puck is observed sliding at a velocity of 2m/s directed 60 degrees to the right of the x-direction. What is the speed and direction of the 3kg puck?



Is energy conserved in this problem? Show your working.

Question 3

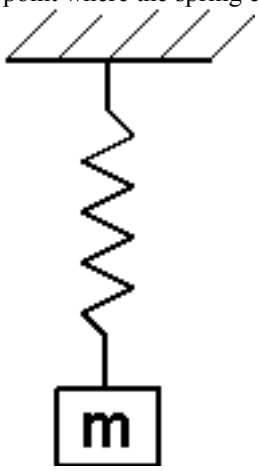
Let's take the case of a .010kg bullet being fired by a 4kg gun. Starting from rest, the bullet has a muzzle (end of the gun) velocity of 600m/s The question is, how fast is the gun moving after it is fired, assuming that the gun is free to move?: Let's start with a diagram:



Why are bullets more dangerous than guns. Think kinetic energy!!

Question 4

1. An object of mass 4kg is attached to a spring. The equilibrium position of the object is .4m from the point where the spring exerts no force on the object. What is the spring constant, k?



a) 20N/m
b) 25N/m
c) 45N/m
d) 50N/m
e) 100N/m