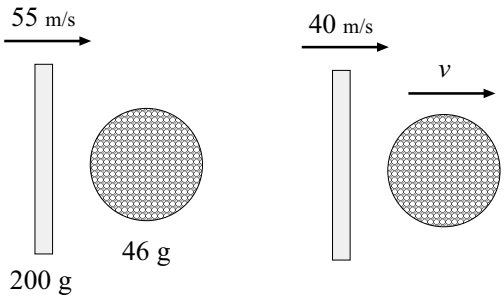
Name_____

Phys 2010 (NSCC), Fall 2007
Problem Set #9

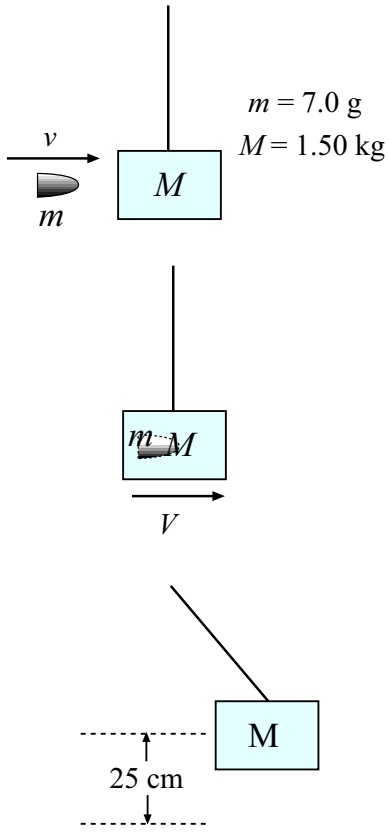
1. High-speed photographs show that the head of a 200-g golf club is traveling at $55\,\frac{\text{m}}{\text{s}}$ just before it strikes a 46-g golf ball at rest on a tee. After the collision, the club head travels (in the same direction) at $40\,\frac{\text{m}}{\text{s}}$. Find the speed of the golf ball just after impact.



2. Find the total kinetic energy of the objects before and after the collision in problem 1. How much kinetic energy was lost?

3. A 7.0-g bullet is fired into a 1.5-kg ballistic pendulum. The bullet sticks in the block and the block rises to a maximum height of 25 cm.

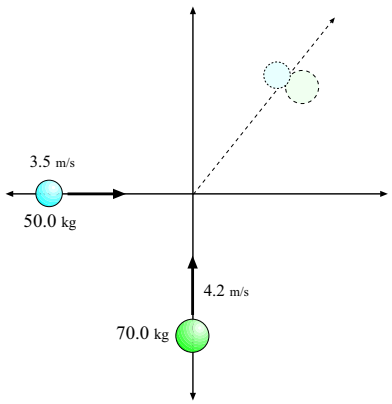
Using energy conservation, find the speed which the pendulum bob (and embedded bullet) must have had just after the collision.



4. In Problem 3, find the initial speed of the bullet.

5. On a frictionless surface, a 50.0 kg mass is moving in the $+x$ direction with a speed of $3.50\,\frac{\text{m}}{\text{s}}$ and a 70.0 kg mass is moving in the $+y$ direction with a speed of $4.20\,\frac{\text{m}}{\text{s}}$; they collide and stick together.

Find the velocity components (v_x and v_y) of the combined mass after the collision

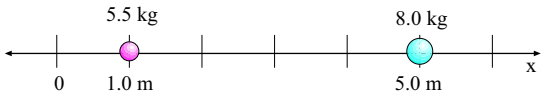


6. In problem 5 find the speed and direction of motion of the combined mass after the collision.

7. On a linear frictionless track, a 0.800 kg cart is rolling with speed $2.40\,\frac{\text{m}}{\text{s}}$ toward a stationary cart of mass 1.40 kg. They have an *elastic* collison.

Find the *velocities* of the masses after the collision.

8. Two masses lie on the x axis: A 5.5 kg mass is at $x = 1.00$ m and a 8.0 kg mass is at $x = 5.00$ m.



What is the coordinate of the center mass of this system?