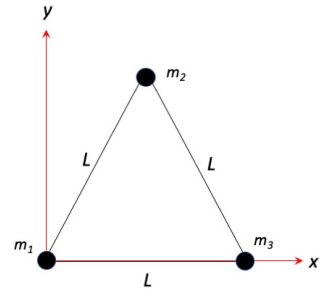


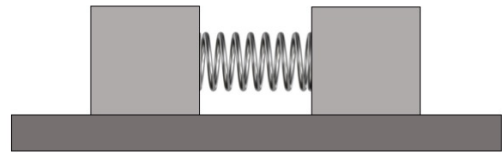
**Chapter 8 Written Homework Problems**  
**DUE: March 8th at the beginning of class**  
**SHOW ALL WORK FOR FULL CREDIT**

1. (a) Locate the center of mass, relative to the origin (taking the origin of the  $x$  and  $y$ -axes at  $m_1$ ), of the triangle shown. (b) If  $m_1 = m_3$  where is the center of mass located? (c) If  $m_1 = m_2 = m_3$  where is the center of mass located?



2. Two objects, one of mass  $m$  and one of mass  $M$  make a perfectly elastic head-on collision. If the masses each have an initial speed  $v$  what are their final speeds? Take  $m = 1$  kg and  $M = 3$  kg.

3. Two identical masses resting on a frictionless surface are held against a spring of spring constant  $k$  that has been compressed a distance  $d$  past its relaxed length. After the masses are released, what is their speed when they are no longer in contact with the spring?



4. Given the arrangement of pendulums shown, if the one on the left is released from rest at an angle  $\theta$ , how high does the center of mass rise following the collision if the collision is (a) perfectly inelastic. Show that your answer makes sense if  $m_2 = 0$ , and if  $m_2 \rightarrow \infty$ . (b) Assuming  $m_2 = m_1$  how high does the center of mass rise if the collision is perfectly elastic?

