Physics 241 – Collision in 2D Pre-Lab Assignment

## Part 1: Excel Task – CM of a system of 2 particles

System:

Particle A has mass = 1 kg and position $X = \begin{bmatrix} -5 \\ -3 \end{bmatrix} m$ and velocity $v = \begin{bmatrix} 2 \\ 3 \end{bmatrix} m/s$

Particle B has mass = 2.5 kg and position $X = \begin{bmatrix} 4 \\ -3 \end{bmatrix} m$ and velocity $v = \begin{bmatrix} 2 \\ 3 \end{bmatrix} m/s$

1. Write an Excel equation that calculates the position of particles A & B for any time t
2. Write a Excel equation that calculates the position of the CM of the system of particles for any time t
3. Prepare an XY plot of the two particles and the CM over a 10 s interval in increments of 0.5 s
4. E-mail your completed Excel spreadsheet file to me: brian.martin@kingsu.ca

Part 2: To Hand In

1. Use CoM and CoE to predict the final velocity for the particles shown below after they collide elastically where m_1 = 1 kg, m_2 = 2.5 kg, v1 = 10 m/s, v2 = 20, θ_1 = 30, θ_2 = 20 and θ'_1 =40. Is this collision possible?
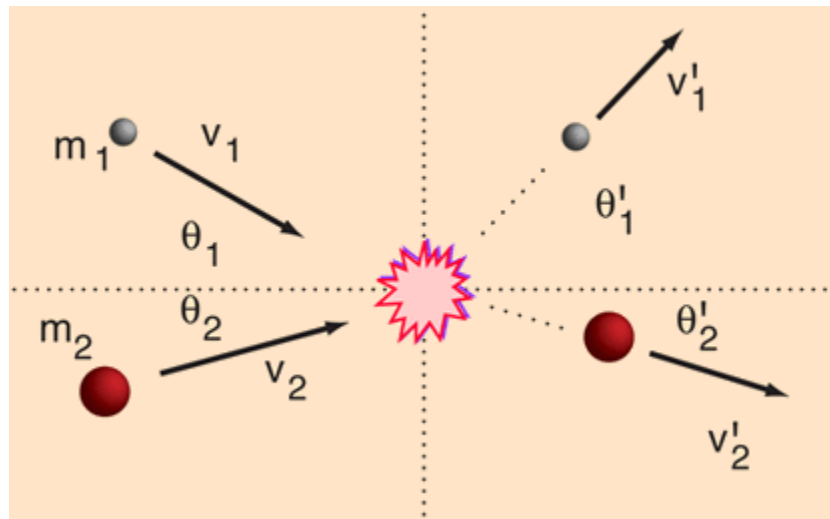
2. Assume e = 0 and repeat the analysis from above. Show that the energy of the CM is conserved.