1. Show that the scattering angles of particles with masses $m_1$ and $m_2$ in the lab system (in which $m_1$ particle initially is at rest) can be expressed through the scattering angle in the center of mass ($\theta$) as follows:

$$\tan(\theta_1) = \frac{m_2 \sin(\theta)}{m_1 + m_2 \cos(\theta)},$$

and $\theta_2 = \frac{\pi - \theta}{2}$

where $\theta_1$ and $\theta_2$ are the scattering angles of $m_1$ and $m_2$ particles in the lab frame.