5. Show that for the special case of $\eta = 2$ (Coulomb molecules),

$$\chi = 2\sin^{-1}\left[\frac{1}{\left(1 + W_0^2\right)^{\frac{1}{2}}}\right].$$

6. Consider a potential given by

$$V = \begin{cases} 0, & r > r_0 \\ a, & r \leq r_0 \end{cases}.$$  

Where $a$ and $r_0$ are constants. Determine $\chi(c, b)$. Determine bounds on $r_0$ and $a$ such that the solution corresponds to a real scattering trajectory.

7. Verify that the hard-sphere viscosity and momentum cross sections are given by Eqs. (2.32) and (2.33).

8. Determine the minimum deflection angle that corresponds to a cut-off value of $W_{0,m} = 1.5$ for the dimensionless impact parameter $W_0$ in a gas of (a) Maxwell molecules and (b) inverse twelfth-power molecules [Ans: (a) $\chi = 11.1^\circ$, (b) $\chi = 0.5^\circ$].