1. Consider scattering from a hard sphere

\[ V(r) = 0 \quad r > a \]
\[ V(r) = \infty \quad r < a. \]

a. Find the phase shifts for all partial waves.
b. Find the total cross section for low energies (ie for \( ka << 1 \)).
c. Find the total cross section for high energies (ie for \( ka >> 1 \)).