1. Which produces a greater change in the initial velocity of stars in a stellar system: infrequent near collisions, or frequent distant collisions? Show your work.

2. Consider a star with a mass of one solar mass, in a galaxy of stars of identical mass. The star is at the $3 \sigma$ tail of the velocity distribution function and has a velocity of $60 \text{ km s}^{-1}$ in a stellar system where the mean is $0 \text{ km s}^{-1}$. Does this star suffer dynamical friction? If not, explain. If so, how long does it take to reach a velocity within $1 \sigma$ of the mean?

3. Using the expression for the amplification of a gravitational lens derived in class, plot the light curve (i.e. the amplification as a function of time) of a star being lensed by a non-luminous star of identical mass, when it passes within 0.5, 1.0, and 2.0 times the Einstein angle of the lensing star.