Astron 299/L&S 295 Problem Set 7

Given: Nov 9. Due: Wednesday, Nov 16 at the beginning of class

Homework Policy: You can consult class notes and books. Always try to solve the problems yourself; if you cannot make progress after some effort, you can discuss with your classmates or ask the instructor. However, you cannot copy other's work: what you turn in must be your own. Make sure you are clear about the process you use to solve the problems: partial credit will be awarded.
Reading: Kutner Chapter 17

Problem 1   Kutner 17.5

Problem 2   Kutner 17.6

Problem 3   Kutner 17.7

Problem 4   Kutner 17.9

Problem 5   Order of Magnitude: Colliding Galaxies

Consider a disk galaxy with radius $15\,$kpc, thickness $1\,$kpc, and mass in stars $M_* = 5 \times 10^{10}\,M_\odot$. Estimate the average number density of stars in this galaxy (the number of stars per unit volume). Assume all of the stars have the same mass, and make a reasonable estimate of that mass.

Now consider two such galaxies, colliding. How far can a star in either of these galaxies travel before hitting another star? Do you think stars are likely to hit each other when galaxies collide?