Problem Set 10

Parts A-B Due Monday, December 10 in class

Part A - Conceptual

1. Explain in your own words why the radii of white dwarfs decrease as their mass increases.
2. Describe in your own words the processes of nuclear photodisintegration and neutronization. When do they happen and why are they important?
3. What is meant by the "spin down" of a pulsar?
4. Draw a flow chart of the life cycle of stars. Where stars of different masses or with/without a companion take different evolutionary paths, label them (e.g. M<8Msun). Note at each stage anything unique about that phase of a star's life (e.g. what is it burning and where? How do its size and surface temperature compare to other points in its life cycle).

Part B - Quantitative

1. Maoz 4.4. (*Note that there is a typo in the book and the velocity should be* ***3*** *x* 10^4 *km/sec*)
2. Maoz 4.6 b and c. *Hint: The separation a is a function of time. Differentiate both sides of the equation in 4.6a with respect to time and use the quotient or chain rule to get d/dt(1/a). For part c, note that you will want to put limits on the integrals on both sides of your equation from (b).*

Part C – Computational

Revised instructions for a MESA prelab will be distributed in class on Wednesday, Dec 5 and due at the start of class on Friday, Dec 7.