

Astronomy 115-06, Fall 2007
Homework #4
Due Friday, November 16, 2007

SHOW ALL YOUR WORK TO GET FULL CREDIT!

Chapter 10 (pg. 223)

What is a red giant, and where do they come from? What is a white dwarf, and where do they come from?

Problem #1: About how long will a 0.4-solar-mass star spend on the main sequence? (Hint: See Reasoning with Numbers 9-1).

Problem #9: The Crab Nebula is now 1.35 pc in radius and is expanding at 1400 km/s. About when did the supernova occur? (Hint: 1 pc equals 3×10^{13} km.)

Chapter 11 (pg. 247)

What is meant by escape velocity, and what is the escape velocity of a black hole?

Review Question #14: What evidence can you cite that black holes really exist?

Problem #5: If the inner accretion disk around a black hole has a temperature of 1,000,000 °K, at what wavelength will it radiate the most energy? What part of the spectrum is this in? (Hint: Use Wein's Law, Reasoning with Numbers 6-1.)

Chapter 12 (pg. 275)

Problem #1: Make a scale sketch of our galaxy in cross section. Include the disk, sun, nucleus, halo, and some globular clusters. Try to draw the globular clusters to scale size.

Problem #8: If the sun is 5 billion years old, how many times has it orbited the center of the galaxy?

Chapter 13 (pg. 298-299)

Review Question #4: What is the difference between an Sa and an Sb galaxy? Between an SBb and an Sb?

Review Question #6: How do selection effects make it difficult to decide how common elliptical and spiral galaxies are?