

Astronomy 13 – 2010S: Homework Set 4 Due Date: Tues 25 May 2009
Late Homeworks accepted up to Tues 1 Jun 2010 for ½ credit

Please put your NAME on ALL your answer sheets. Reminder about showing steps and reasoning and assumptions and equations used.

1. (1%) Explain the meaning of each of the following terms in one sentence and its importance to cosmology in another sentence.

Curved Space; Inflation; Deuterium; Theory of Everything

2. (1/2%) What is the relationship of the “geometry of space” and each of the following models of the universe: unbound, bound, and critical?

3. (1/2%) Figure 27-2 (29-2 in older editions) in the Universe book shows the expansion of the Universe during inflation. Estimate ROUGHLY what AVERAGE speed of expansion did the visible Universe undergo during Inflation and compare your estimate to the speed of light. You can approximate the average speed by merely using differences of the size at beginning and end of the inflation process and the differences in time.

4. (1/2%) In one or two sentences, describe what is the relationship among the Heisenberg uncertainty principle, the Schwarzschild radius, and the Planck Era of the early universe?

5. (1%) In one sentence or a few words, specify when and how were each of the following created in the Universe?

A) protons/hydrogen b) helium c) carbon d) iron

6. (1/2%) Specify 3 or more differences between the disk and halo of our Milky Way galaxy.

7. (1/2%) Specify 3 or more differences between spiral and elliptical galaxies.

8. (1/2%) Specify 3 or more **different kinds/classes** of candidates for dark matter.

9. Extra Credit (1%) What are the best two clues, in your opinion, to the nature of Active Galactic Nuclei? Explain your answer.

10. Extra Credit (1%) What two aspects did you like and two aspects you did not like from the materials presented in Chap 10 of the Big Bang book?