

Assignment # 10  
Due Friday, December 4, 2009

## Instructions

On this and future assignments, please write your name on all pages and staple all pages together. Write very clearly!

Please be sure to explain your answer to all word problems briefly but carefully, and to show all your work on the calculations. The grade on each problem will reflect more the verbal explanations and the calculations shown rather than the final answers given in the back. (In fact, the answers to most of the quantitative questions from the book are given in the back and I'll give you the answers to most of my quantitative questions right on the assignments).

You may work with others on the homework problems, but you must write them up yourself, using your own words and calculations. If you hand in a paper nearly identical to someone else's, neither of you will get any credit because we won't know whether or not you actually did the work.

Also, the solutions will be shown on our class website very soon after the due date: <http://www.ucsb.physics.edu/~astro1/fall2009>. Partly for this reason, we **cannot accept late homework! (Only exception: if you have an emergency and tell me before the due date).**

We will only grade a few problems in detail for 10 points and check to see if you've made a reasonable attempt on the others for the remaining 5 points.

## SHOW ALL WORK

1. The spectrum of a certain distant galaxy shows a redshift of  $\Delta\lambda/\lambda = 0.1$ . a) At approximately what velocity is this galaxy receding from us? b) Using 70 km/s/Mpc, what is the distance to the galaxy? c) The galaxy is 30 arcseconds across. What is its size in lightyears? d) The apparent brightness of the galaxy is  $10^{-15}$  W/m<sup>2</sup>. What is the galaxy's luminosity?
2. What is the cosmic microwave background?