AST 250 Spring 2010
HOMEWORK #1

Due Friday Jan 22

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(1) Prove that the fundamental cgs units of G, the gravitational constant, are $cm^3/g\ s^2$.

(2) If the black hole (Sgr A*) at the center of the Milky Way is 8.5 kpc away from the Sun, what is the parallax of Sgr A* due to the motion of the Earth around the Sun? Please give your answer in a reasonable unit of arcseconds. How many years does it take light from the center of the Milky Way to reach Earth?

(3) At the Submillimeter Telescope (SMT) on Mnt. Graham ($\phi = 32^o\ 42'\ 6''$), the trees limit observations to elevations greater than 20^o. What is the lowest declination observable with the SMT?

(4) It is 2h LST for an observer standing in Tucson. What is the hour angle of the Orion Nebula (M42 α= 5h 35m 24s $\delta = -5^o\ 27'$)? Roughly, what direction would the Orion Nebula appear in the sky at that instant?

(5) At 12h LST, an observer on Kitt Peak ($L_w = 111^o\ 36.0'$ $\phi = +31^o\ 57.8'$) receives an email alert from the Fermi satellite of a powerful gamma ray burst centered at the coordinates (α=7h 30m 15s $\delta = +50^o\ 30'\ 0''$, current epoch). What would be the elevation of the gamma ray burst for the observer on Kitt Peak?