

**General Astronomy (29:61)**  
**Fall 2012**  
**Homework Set #1**  
**Assigned: August 24, 2012**  
**Due: August 31, 2012**

1. What is the current, approximate distance from the Earth to the planet Jupiter? Figure out a way to determine this distance. There is more than one way to do it. You must describe your approach and show your work. It is not necessary to give a very precise number. One which is accurate at the 5 % - 10 % level is fine.
2. Using your answer to question # 1, what is the round-trip time that it would take a radio signal to travel from the Earth to a spacecraft orbiting Jupiter, and then make the return trip?
3. An airplane flies over Iowa City, traveling from the southwestern United States en route to Chicago O'Hare airport. Describe the path in terms of the horizon coordinate system from the time an observer first sees it until he or she last sees it.
4. On a certain location on Earth, the bright star Altair ( $\alpha$  Aquilae, visible in the southern sky these evenings when it gets dark) passes through the zenith during its diurnal motion. What is the latitude of the location?
5. This question is for observations in Iowa City. What is the altitude angle of the bright star Arcturus ( $\alpha$  Bootis, visible high in the western sky at nightfall) when it transits?
6. The nearest star to the solar system is  $\alpha$  Centauri. What is its altitude angle at transit here in Iowa City. What does your number tell you?
7. Here in Iowa, the *ecliptic* crosses the *meridian* at a maximum altitude angle of  $72.1^\circ$  and a minimum altitude angle of  $24.9^\circ$ . The *inclination* of the Moon's orbit to the ecliptic is  $5.1^\circ$ . What are the highest and lowest altitude angles that the Moon ever has at transit (here in Iowa)?
8. Table A.3 in the Appendix A will be helpful on this one. Assume that Mars and the Earth have the same average density (seems reasonable, doesn't it?). In that case, what would be the ratio of the mass of Mars to the mass of the Earth. Compare this calculation with the true value, and comment on the comparison. What does it tell you?