Observational Astronomy - Spring 2014
Homework 2 - Coordinates, Constellations, Magnitudes, Types of Objects

1. What is the maximum and minimum declination of the Sun? When does the sun reach these points?

2. Estimate the transit time of the star Vega on June 1. Show your calculations. (Note: All transit times in this homework can be within ±15 minutes.)

3. On February 15, 2014, Jupiter will be at the location $RA = 6^h47^m, Dec = +23°12'$. When will Jupiter transit on that date? What will be the hour angle of Jupiter at 7:00 PM on that date? Show your calculations.

4. Comet 2014A4 (also called Comet SONEAR) has been reported to have the following ephemeris (an ephemeris is a list of coordinates vs time).

Date	RA	Dec
Feb 1	$RA = 5^h30^m$	$Dec = -37°19'$
Mar 1	$RA = 5^h10^m$	$Dec = -32°49'$
Apr 1	$RA = 5^h2^m$	$Dec = -27°34'$
May 1	$RA = 5^h5^m$	$Dec = -22°50'$
Jun 1	$RA = 5^h15^m$	$Dec = -20°17'$

Assume that you need the comet to be at least $20°$ above your southern horizon in order to see it above the trees, buildings, smog, etc. What is the first date in the table when it reaches this altitude? What is it's transit time on that date? Will you likely be able to see it from New York? (In fact this comet is quite faint, only about magnitude +17, so it would take a really big telescope to see it. But let's assume that you have a big enough telescope, and the brightness is not a problem).

5. Rigel has an apparent magnitude of +0.15, and is about 240 parsecs away. What is its absolute magnitude? How much more luminous than the Sun is it? Show your calculations.

6. The Sun has an absolute magnitude of 4.83. If our descendants set up a colony at out nearest stellar neighbor, Alpha Centauri, which is 1.33 parsecs away, what apparent magnitude will they see the Sun to have? Will it be a naked eye object?

7. Look up the following objects and fill in the table.

Object	RA	Dec	Constellation	Type
Messier 13				
Messier 101				
Messier 45				
Messier 42				
Messier 31				