Physics 108 - Cosmology Homework 2

1. The elevation of the pole star above the horizon is equal to the latitude of the observer. See Fig 2.6 in the textbook.

Marist is at 41.72074° North longitude, so Polaris will be about 42° above the horizon. +5

The pole star is due north for everybody, so the azimuth will be 0°. +5

Altitude: 42°
Azimuth: 0°

2. Tycho rejected the heliocentric view because he thought that if the Earth moved then we would see the stars move slightly due to "parallax". Parallax is where one's view of something nearby changes compared to a far away background when your point of view changes. It's what makes 3D movies work. (We do in fact see parallax when viewing the sun as the stars behind it change from month to month - See Fig 4.3) +5

3. Use equation 4.1 For Synodic period (it's based on the relative speeds of the two planets).

+5

$$\frac{1}{S} = \frac{1}{P_1} - \frac{1}{P_2} \qquad P_2 = 1680 \text{ days} \qquad P_1 = 365.25 \text{ days}$$

$$S = \left[\frac{1}{365.25} - \frac{1}{1680}\right]^{-1} = 467 \text{ days}$$

4. You will know you were successful if you enter the coordinates and find a well known star there, or the Pleadies, or the Andromeda galaxy (M31)

+5

5.

+5 a) Sketch should show Jupiter and 4 moons

+5 b) Sketch should show the moons in different positions.

Both sketches should be labeled by date

6. Your measurements from the computer screen should be similar to the values here, but there is no expectation that you'll get exactly the same values. (a is in <u>diameters</u> of Jupiter!)

	Moon	a	P (hrs)	P^2/a^3
+5	Io	2.95	42.5	70.4
+5	Europa	4.69	85.2	70.4
+5	Ganymede	7.49	171.6	70.1
+5	Callisto	13.2	400	69.8

The fact that P^2/a^3 is just about the same for all four moons, confirms Kepler's 3rd Law.

55