Astronomy Problems II

1. What would be the distance to the sun, in astronomical units, of an inferior planet that had a greatest elongation of 30º? Assume circular orbits for the planet and the earth.

2. The earth's distance to the sun varies from 147.4 million to 152.1 million km. What is the eccentricity of its orbit?

3. If a superior planet had a synodic period equal to its sidereal period, what would this period be? Which planet most closely approximates this condition?

4. What would be the sidereal period of an inferior planet that appeared at conjunction exactly once a year?

5. What would be the sidereal period of a planet whose orbit had a semimajor axis of 4 AU? What would be its synodic period as seen from earth?

6. Kepler's Laws also apply to the motion of the moon around Jupiter. Suppose that moon A has a period 5.196 times as long as moon B. What would be the ratio of the semimajor axes of their orbits?

7. Halley's Comet has a period of 76 years, and an orbital eccentricity of 0.97. What is the semimajor axis of the orbit of this famous comet around the sun, in astronomical units? What is its perihelion? Aphelion?

1) D=0.5 AU 2) e=0.0157 3) T=2 years, Mars 4) T=0.5 years 5) T=8 years; S=1.14 years 6) $R_A/R_B = 3$ 7) R=17.9 AU; perihelion=0.5 AU; aphelion=35.3 AU