

Astronomy Problems III

5. Imagine there is an asteroid orbiting the sun with an orbital eccentricity of 0.1. It also has a sidereal period of .617 years.
- What would be the asteroid's perihelion distance?
 - What would be the aphelion distance?
 - What is the synodic period of the asteroid?
 - What would be the angle of greatest elongation for this asteroid? (If applicable.)

Answers

- a) $R=55 \text{ AU}$ b) $\text{perihelion}=10 \text{ AU}$ c) $e=0.82$ d) $S=1.002 \text{ years}$
- a) $T=11 \text{ years or } 5500 \text{ days}$ b) $R=4.95 \text{ AU}$ c) $\text{perihelion}=3.96 \text{ AU}; \text{ aphelion}=5.94 \text{ AU}$
- a) $\text{apogee}=63.3 R_e$ b) $e=0.055$ c) $R=6.6 R_e$
- $\theta=2.1 \times 10^{-4} \text{ degrees } (=0.013' = 0.77'')$
- a) $\text{perihelion}=0.653 \text{ AU}$ b) $\text{aphelion}=0.798 \text{ AU}$ c) $S=1.61 \text{ years}$ d) $\theta=46.5^\circ$