PROBLEM SET #3
APAS 1030

Think each problem through, and present your logic.

1. Halley's comet is moving at 60 km/s near perihelion, at approximately the orbit of Venus. At aphelion it is near Neptune. How fast is it moving? Use Kepler's laws.

2. It is thought that comets are chunks of ice that have spent most of the lifetime of the solar system orbiting at about 10,000 AU from the Sun. What is the period of such an orbit?

3. Use Kepler's law, and scale from the Moon's orbit to determine the period of a low Earth orbit (i.e. just above the atmosphere). How high is a syncom satellite? (ie. 24 hour period.)

4. Explain how Galileo proved the Sun was a sphere, not a disk.

5. A car is sitting on a frictionless surface. It has a mass of 10^3 kg. A force of 100N is applied. How long will it take for the car to accelerate to 1m/s?

6. Calculate the escape velocity of the Moon, using data from the textbook.

7. In the far future planetary systems are designed by engineers instead of nature. The following binary planet is proposed. The two planets are held apart by a steel rod instead of centrifugal force as shown below. They do not revolve about each other, but do rotate on their own axes. Do the oceans on these planets have tides and, if so, how many high tides are there per day?