

Your name: _____

Arvind Borde

AST 9: Homework 2

- 1] What are some of the difficulties with the view that the Earth is the center of the Universe?
- 2] If $y \propto x$ and x doubles, what will happen to y ?
- 3] If you unexpectedly gain mass overnight to double what you were, would the gravitational force between you and the earth change, and by how much?
- 4] Saturn is roughly ten times as far from the sun as the earth is. If the earth were suddenly to pack up and move to Saturn's orbit, how would the gravitational force between it and the sun change?
- 5] The sun is much more massive than the earth. Why does its gravitational pull not pluck us off the earth? (If you've always wanted a summer home, what better place than the sun?)
- 6] Can you ever see Venus at midnight? How about Jupiter? Explain your answer in both cases.
- 7] What is the perihelion of a planetary orbit? What does the "precession of the perihelion" refer to?
- 8] A "year" for a planet is the time taken for it to complete one orbit around the sun. Expressed in earth years, the years on the 8 planets are 0.2 (Mercury), 0.6 (Venus), 1.0 (Earth), 1.9 (Mars), 11.9 (Jupiter), 29.4 (Saturn), 84.0 (Uranus), and 164.8 (Neptune). Is there a pattern linking the length of a year to distance from the sun? Using all the gravity at your disposal, why is this the case?