

Natural Sciences 102 -- Spring 2005

Homework #2, April 5, 2005

Due in class April 12, 2005

1. Johannes Kepler was not a happy camper. He had a miserable life, obviously tormented by inner demons, a hypochondriac, obsessive, compulsive, and repulsive. But there is hope for him. Miraculously, one of Dr. Copernicus's prescriptions can cure him and make him "normal." Just one tablespoon of donkey urine once a week will make him happy, well adjusted, and *normal*. The only side effect is the taste (it tastes like...well you know what it tastes like). As Kepler's friend, do you advise the poor creature to take the magic medicine and become perfectly normal? Sick puppy or normal? Tortured genius or normal? It's your call. Please think about the cost/benefit of Kepler becoming normal and write a one-page recommendation addressed to him.

2. Kepler's First Law: Ellipses are fun:
 - a) Draw an ellipse. Use two tacks as foci. Connect a piece of string to the two tacks and trace out an ellipse. Indicate the semimajor axis. Estimate the eccentricity of your ellipse? [You may wish to look at an elementary math book to recall the definition of semimajor axis and eccentricity.] Name your ellipse (you know, George, Condi, Dubya, or something like that).
 - b) Sketch some ellipses with the same major axis but different eccentricities.
 - c) Sketch some ellipses with the same eccentricity, but different major axis.

3. Kepler's Third Law: The orbital period of the moon is 27.3 days, and its distance from the earth is 3.8×10^{10} cm. If a satellite is in geosynchronous orbit, what is the distance from the earth to the satellite?

News of the week

- Mouse around <http://home.fnal.gov/~rocky/NS102> for exciting information, including all diagrams and pictures projected in class.
- Last Thursday's skit is also on line.
- Laboratory sections begin this week.
- Don't forget the reading assignment, Kolb, Chapters 1-5. There will be a lot of reading next month, so you may want to read ahead.
- If you have any recommendations for celestially inspired music, please send them to me at rocky@rigoletto.uchicago.edu.