Math 10460 - Honors Mathematics II
Homework 5a - Due Wednesday, February 17

Now would be an excellent time to begin working on your project if you have not yet begun!!! This homework assignment will require you to look up real astronomical and geological data! Be sure to identify all of your data in this assignment, as it will be essential to checking the correctness of your work!!!

A satellite is in *geosyncrhonous* orbit if the orbital period of the satellite matches the rotational period of the Earth.
 (1) What is this period? Note that it is *NOT* 24 hours! (This is why we have Leap Year!)
 (2) What are satellites in geosynchronous orbits used for?

A special kind of geosynchronous orbit happens when the orbit lies over the equator. This type of orbit is called *geostationary*. Geostationary orbits are circular.

 (3) What is the mass of the Earth?
 (4) Using the mass of the Earth and the period of a geosynchronous orbit, find the (approximate) radius of a geosynchronous orbit. *Hint*: You will need a certain physical law to do this.
 (5) The Earth's equator passes through land in the following countries: Ecuador, Colombia, Brazil, São Tomé and Príncipe, Gabon, Republic of the Congo, Democratic Republic of the Congo, Uganda, Kenya, Somalia, and Indonesia. Choose a real city which is located (approximately) on the equator and suppose that there is a satellite in geostationary orbit directly above that city. How far above ground level in the city is this satellite?