Updated on January 12, 2021

Math 3607: Homework 1

Due: 11:59PM, Tuesday, January 19, 2021

Do the following problems from the textbook. The notation *Problem 2.1–6* indicates Problem 6 at the end of Section 2.1.

1. Do Problem 2.1–6
2. Do Problem 2.1–8: From part (a), do only (i), (iii), and (vi). Then do (b) and (c)
3. Do Problem 2.1–14(a)
4. Write a script which asks for a temperature in Fahrenheit, converts the temperature into Celsius, and prints it. *(Modified from Problem 2.2–5)*
5. An *oblate spheroid* such as the Earth is obtained by revolving an ellipse about its minor axis as shown in the figure. The Earth's equatorial radius is about 20km longer than its polar

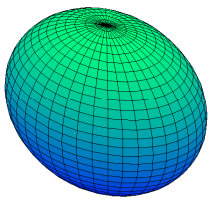

Figure 1: An oblate spheroid. Image created using MATLAB.

radius. The surface area of an oblate spheroid is given by

$$A(r_1, r_2) = 2\pi \left(r_1^2 + \frac{r_2^2}{\sin(\gamma)} \log\left(\frac{\cos(\gamma)}{1 - \sin(\gamma)} \right) \right),$$

where r_1 is the equatorial radius, r_2 is the polar radius, and

$$\gamma = \arccos\left(\frac{r_2}{r_1} \right).$$

We assume $r_2 < r_1$. Write a script that inputs the equatorial and polar radii and displays both $A(r_1, r_2)$ and the approximation $4\pi((r_1 + r_2)/2)^2$. Apply the script to the Earth data $(r_1, r_2) = (6378.137, 6356.752)$. Use `format long g` to display enough digits.

TOTAL: 20 points