Homework 2
Due Friday, September 9th at 5pm

Reading: Read the remaining sections of Boas Ch. 1, sections 5-10.

All Boas problems below refer to Ch. 1.

1. Consider a cubical chunk of ice of mass m oscillating about the bottom of a hemispherical bowl of radius R. Compute the Taylor series expansion of the potential energy and use it to find the frequency of the oscillation.

   Independently, use force methods to compute this frequency of oscillation. Do the two methods agree?

2. (**a**) What conclusion do you have to be careful not to draw when using the preliminary test? (**b**) Use this test on the following series:

$$\sqrt{2} + \frac{\sqrt{3}}{2} + \frac{\sqrt{4}}{3} + \frac{\sqrt{5}}{4} + \frac{\sqrt{6}}{5} + \cdots$$

   and

$$\sum_{n=2}^{\infty} \left(\frac{1}{3} - \frac{1}{n^2} \right).$$

3. Boas Problem 15.29.

4. Boas Problem 6.2 and 6.3.

5. Boas Problem 15.31.

6. Boas Problem 16.30.

7. Boas Problem 15.33.