Spring 2013 Math 152

Week in Review 5

courtesy: Amy Austin

(covering section 10.3-10.4)

Section 10.3

1. Determine whether the following series converge or diverge.

   a.) $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

   b.) $\sum_{n=2}^{\infty} n^2 e^{-n^3}$

   c.) $\sum_{n=1}^{\infty} \frac{n^4}{n^8 + n^2 + 1}$

   d.) $\sum_{n=2}^{\infty} \frac{1}{n - 2\sqrt{n}}$

   e.) $\sum_{n=1}^{\infty} \frac{\sin^2 n}{n\sqrt{n}}$

   f.) $\sum_{n=1}^{\infty} \frac{n^2 - n}{n^3 + 7n}$

   g.) $\sum_{n=2}^{\infty} \frac{1}{\ln n}$

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

2. $\sum_{n=1}^{\infty} \frac{1}{n^3}$

   a.) Find the sum of the first 5 terms.

   b.) Estimate the error in using the sum of the first 5 terms to approximate the sum of the series.

   c.) Find the sum correct to 10 decimal places.

3. Consider $\sum_{n=1}^{\infty} \frac{3 + \cos n}{n^5}$

   a.) Prove the series converges.

   b.) Approximate the sum of the series using s_6.

   c.) Estimate the error in using s_6 to approximate the sum of the series.

Section 10.4

4. Use the alternating series test to determine whether $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n+1}}$ converges.

5. Determine whether the following series converge absolutely, converge conditionally, or diverge.

   a.) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2\sqrt{n}}$

   b.) $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$

   c.) $\sum_{n=2}^{\infty} \frac{(-1)^n}{n(\ln n)^2}$

   d.) $\sum_{n=1}^{\infty} \frac{(-1)^n n}{n+1}$

   e.) $\sum_{n=1}^{\infty} \frac{n^2}{(-4)^n}$

   f.) $\sum_{n=1}^{\infty} \frac{3^n n^2}{(2n)!}$

6. Show $\sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!}$ converges absolutely and then approximate the sum of the series with the third partial sum, s_2. How close is this approximation to the sum of the series?

7. Approximate $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$ correct to within 3 decimal places.