

# Spring 2009 Math 152

## Week in Review

*courtesy: Amy Austin*

(covering sections 10.3, 10.4)

### Section 10.3

1. Determine whether the following series converge or diverge. Clearly state what test you applied, and apply it completely and correctly.

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

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

c.)  $\sum_{n=1}^{\infty} ne^{-n^2}$

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

e.)  $\sum_{n=5}^{\infty} \frac{1}{n - \sqrt{n}}$

f.)  $\sum_{n=2}^{\infty} \frac{1}{n^5 - 5n}$

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

h.)  $\sum_{n=1}^{\infty} \frac{\ln n}{\sqrt{n^5}}$

2. Use the 10th partial sum to estimate the sum of the series  $\sum_{n=1}^{\infty} \frac{1}{n^4}$ . How accurate is this estimate?

3. How large do we need to choose  $n$  so that  $s_n$  approximates  $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^4}$  to within  $10^{-3}$ ?

### Section 10.4

4. Determine whether the following series converge or diverge. If it converges, does it converge absolutely?

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

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

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

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

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

5. 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. How close is this approximation to the sum of the series?

6. Approximate  $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$  with error less than .01.