

## Summer 2016 Math 152

### Week in Review 4

*courtesy: Amy Austin*  
(covering 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.)  $\sum_{n=17}^{\infty} \frac{1}{\sqrt{n} - 4}$

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.) By comparing the series to a p-series, estimate the error in using  $s_6$  to approximate the sum of the series.

4. How many terms of the series  $\sum_{n=1}^{\infty} \frac{1}{n(\ln n)^2}$  would you need to add to find its sum to within 0.01?

### Section 10.4

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

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

7. 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?

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