

# Spring 2008 Math 152

Week in Review 7  
7:17-9:15 pm BLOC 102

courtesy: Amy Austin  
(covering sections 10.1, 10.2)

## Section 10.1

1. Find the limit of the following sequences, if it exists. If the sequence diverges, state why.

a.)  $a_n = \frac{n}{\sqrt{n+2}}$

b.)  $a_n = \ln(n) - \ln(3n+1)$

c.)  $a_n = \frac{(-1)^n n}{n^2+1}$

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

e.)  $a_n = \frac{\ln n}{n}$

2. Suppose  $\{a_n\}$  was given to be a convergent sequence,  $a_1 = 2$ , and  $a_{n+1} = \frac{1}{3 - a_n}$ , find:

a.)  $a_4$

b.) the limit of the sequence.

3. Determine whether the following sequences are increasing, decreasing, or non monotonic:

a.)  $a_n = \frac{1}{n^5}$

b.)  $a_n = \frac{n^2 + 4n + 5}{n^2}$

c.)  $a_n = \frac{\ln n}{n}$

d.)  $a_n = \cos(n\pi)$

## Section 10.2

4. Find the first few partial sums of the series

$\sum_{n=1}^{\infty} \frac{1}{n}$  and  $\sum_{n=1}^{\infty} \frac{1}{n^2}$ . Try to determine whether they converge/diverge.

5. Suppose  $\sum_{n=1}^{\infty} a_n$  is a convergent series and

$s_n = 5 + \frac{n}{2n+3}$  is a formula for the  $n$ th partial sum. What is the sum of the series?

6. Find the sum of the following series. If it diverges, support your answer.

a.)  $\sum_{n=1}^{\infty} \left( \frac{1}{n+5} - \frac{1}{n+6} \right)$

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

c.)  $\sum_{n=1}^{\infty} 2 \left( \frac{1}{7} \right)^{n-1}$

d.)  $\sum_{n=1}^{\infty} (-5) \left( \frac{2}{3} \right)^n$

e.)  $\sum_{n=0}^{\infty} \frac{(-1)^n + 3^n}{5^n}$

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

g.)  $\sum_{n=0}^{\infty} \frac{(-1)^n 3^{2n}}{7^{n+1}}$

h.)  $4 + \frac{8}{5} + \frac{16}{25} + \frac{32}{125} + \dots$