READING ASSIGNMENT 13 NAME: ______________________

§11.3 (Series with Positive Terms) Due 23 July 2018

LEARNING OBJECTIVES

By the end of this lesson, you will be able to:

- determine convergence or divergence of series with positive terms by direct comparison, limit comparison, or the integral test,
- recite a proof that the harmonic series diverges using the integral test.

REVIEW

- Review limits, sigma notation, and p-integrals and the integral comparison test from §8.7 (Improper Integrals).

READING

- Read section 11.3. You may skip the proofs of the theorems.

QUESTIONS

(1) Fill in the blanks in the statement of the limit comparison test.

Limit Comparison Test. Let $\{a_n\}$ and $\{b_n\}$ be ______ (1) sequence such that

$$L = \lim_{n\to\infty} \frac{a_n}{b_n}$$

exists. Then

- If $L > 0$, then ______ (2).
- If ______ (3) and $\sum_{n=1}^{\infty} a_n$ converges, then $\sum_{n=1}^{\infty} b_n$ converges as well.
- If ______ (4) and $\sum_{n=1}^{\infty} b_n$ converges, then $\sum_{n=1}^{\infty} a_n$ converges as well.

(2) Anne is trying to determine convergence of $\sum_{n=1}^{\infty} \frac{e^{-n}}{n}$ below. Grade her work.

$$e^{-n} = \frac{1}{e^n} < 1$$

So use the comperisan test.

$$\frac{e^{-n}}{n} < \frac{1}{n}, \quad \sum_{n=1}^{\infty} \frac{e^{-n}}{n} < \sum_{n=1}^{\infty} \frac{1}{n}$$

Harmonic Series

diverges

So $\sum_{n=1}^{\infty} \frac{e^{-n}}{n}$ diverges.

(3) Carefully write a solution to the problem you just graded.