

MATH 242: Principles of Analysis

Homework Assignment #5

DUE DATE: Thurs., Oct. 22, start of class.

Homework should be turned in at the BEGINNING OF CLASS. You should write up solutions neatly to all problems, making sure to show all your work. You are strongly encouraged to work on these problems with other classmates, although the solutions you turn in should be your **own** work. Please cite any references (web based or text) that you may have used for assistance with the assignment.

Note: Please list the names of any students or faculty who you worked with on the top of the assignment.

1. For each of the infinite series below, determine whether the series converges or diverges. Be sure to state which test you are applying and to verify the hypotheses of the test.

a) $\sum_{n=1}^{\infty} \frac{1}{\sin n}$

b) $\sum_{n=1}^{\infty} \frac{n!}{n^n}$

c) $\sum_{n=1}^{\infty} \frac{\sqrt{n^2 - 1}}{n^3}$

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

e) $\sum_{n=1}^{\infty} \frac{n^6 + 1}{n^7 + 1}$

2. Use the Cauchy Condensation Test to show that the series $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$ diverges.

3. Do the following exercises from the course text *Understanding Analysis* by Stephen Abbott: **2.5.3, 2.6.1, 2.6.2, 2.7.1 (part (a) only), 2.7.4, 2.7.8, 2.7.9**