

Written Homework 8

MATH 126

Solve each of the following problems. Work out your problems on scratch paper first, then write your solutions neatly on the pages you plan to turn in. Write the problems in assigned order, with each problem clearly labeled. Use words to clearly explain your work and methods. The reader should never have to guess or infer your intentions.

For a brief guide to writing homework solutions, see *Writing Mathematics Well* from Harvey Mudd College.

Scan or photograph your solutions and submit them (as a single file) to the Written Homework 8 assignment on Moodle. This assignment is due at classtime on **Wednesday, October 22**.

1. Determine whether each series converges or diverges. Explain your reasoning. If you use a test for convergence (e.g., divergence test, limit comparison test, etc.), make sure you explain exactly how you used the test and what conclusion it gives you. If you use a geometric series or a p -series, make sure you say which you are using and why you can conclude convergence/divergence.

(a) $\sum_{n=2}^{\infty} \frac{4n}{\sqrt{n^5 - 2n^2}}$

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

(c) $\sum_{n=1}^{\infty} \frac{n!}{e^n}$

(d) $\sum_{n=2}^{\infty} \frac{\ln(n)}{n}$

2. Use a geometric series to show that $0.\bar{9}$ equals 1. Explain your reasoning in complete sentences.

3. Find (with explanation) all of the values of x for which the series $\sum_{n=0}^{\infty} (x+2)^n$ converges.

Hint: Don't let the variable scare you! It's still a geometric series!