

Math 121A Spring 2015, Homework 1

Due January 30 at 10am

1. Section 1.1 problems 12, 15, 16.
2. Section 1.2 problems 4, 6, 7, 8.
3. Section 1.5 problems 2, 11.
4. Section 1.6 problems 7, 15, 17, 25, 28, 30, 35.
5. Section 1.7 problems 4, 9.
6. Section 1.9 problems 9, 16, 17, 21.
7. (optional, but interesting) Suppose a_n is a nonnegative sequence with $a_{n+1} \leq a_n$ for all n . Show that $\sum_{n=1}^{\infty} a_n$ converges if and only if

$$\sum_{k=0}^{\infty} 2^k a_{2^k} = a_1 + 2a_2 + 4a_4 \dots$$

converges.

Use this to show that $\sum_{n=1}^{\infty} 1/n$ is divergent. What about $\sum_{n=3}^{\infty} 1/n \log n$?

8. How long did this assignment take you?