

MAT 215: PROBLEM SET 5

DUE THURSDAY MARCH 3

Reading: Abbot, Sections 4.2-4.4.

Problem 1:

- (i) Show that $\sum_{n=1}^{\infty} n^{-p}$ converges for $1 < p$ and diverges for $0 < p \leq 1$. **Hint:** Read Theorem 2.4.6 in Abbot.
- (ii) Let $a(x) = x^n + a_{n-1}x^{n-1} + \cdots + a_0$ and let $b(x) = x^m + b_{m-1}x^{m-1} + \cdots + b_0$ be polynomials and assume that for $i \in \mathbb{N}$, $b(i) \neq 0$. Find a condition on m and n so that $\sum_{i=1}^{\infty} \frac{a(i)}{b(i)}$ converges (prove your answer).

Abbot exercises: 2.5.5, 2.6.4, 2.7.1(a), 2.7.7.