

MAA 4211, Fall 2016—Assignment 7's non-book problems

B1. In problem #3 on p. 91 of Rosenlicht, suppose you remove the hypothesis that the sets S_1, S_2 are both closed. Is the conclusion still true? (Prove your answer, of course.)

B2. (This problem gives a second proof of a lemma we proved in class.) Let (E, d) be a metric space, let $(p_n)_{n=1}^{\infty}$ be a convergent sequence in E , let $p = \lim_{n \rightarrow \infty} p_n$, let $N \in \mathbf{N}$, and let $\epsilon > 0$. Assume that for all $n, m \geq N$, $d(p_n, p_m) < \epsilon$. Use the appropriate half of the “sequential characterization of continuity” to prove that $d(p_N, p) \leq \epsilon$. *Hint:* Consider the function $f : E \rightarrow \mathbf{R}$ defined by $f(q) = d(p_N, q)$.