

MAT 319/320: Basics of Analysis, Spring 2018

Homework Assignment 4

Please read Sections 11 and 12 of Ross's textbook thoroughly.

Optional supplemental reading for MAT 320: Rudin's book, pp55-58

Problem Set 4 (**due at the start of recitation on Wednesday, February 21st**):
11.3, 11.4, 11.8, 11.9, 11.10, 12.2, 12.3, 12.6, 12.13, and the following:

- (1) Find a sequence whose set of subsequential limits is equal to each of the following, or state why this is impossible. You may find example 11.3 in the book helpful, and you may refer to the sequence r_n described there in your answers.
 - (a) The open interval $(0, 1)$.
 - (b) The set $\mathbb{Z}_{>0} \cup \{+\infty\}$ of positive integers, with $+\infty$.
 - (c) The set $\mathbb{Z}_{>0}$ of positive integers, without $+\infty$.
 - (d) The set $\mathbb{Z} \cup \{-\infty, +\infty\}$ of integers, with $-\infty$ and $+\infty$.
 - (e) The set $\mathbb{Q} \cap [0, 1]$ of rationals in the interval $[0, 1]$.
 - (f) The set $\mathbb{R}_{\geq 0} \cup \{+\infty\}$ of nonnegative real numbers, with $+\infty$.
 - (g) The set $\mathbb{R}_{\geq 0} \cup \{-\infty, +\infty\}$ of nonnegative real numbers, with $-\infty$ and $+\infty$.
 - (h) The set $\{-\infty, +\infty\} \cup \bigcup_{n=-\infty}^{\infty} [2n, 2n + 1]$. This is the union of $\{-\infty, +\infty\}$ with
 $\dots \cup [-6, -5] \cup [-4, -3] \cup [-2, -1] \cup [0, 1] \cup [2, 3] \cup [4, 5] \cup \dots$.
 - (i) The empty set \emptyset .