Math 104 Homework 1 (Vaintrob)

Due Tuesday, 2/12

1 Exercises 7.1, 7.2

2 Exercise 7.3

(a), (c), (e), (i)

3 Exercise 8.1

4 Exercise 8.2

5 Exercise 8.3

6 Exercise 8.4

7 Exercise 8.5

8 Challenge problem

You can choose to do this instead of any three of the above.

This problem assumes knowledge of the formal definition of what it means for a function to be continuous (17.1 in the book).

Show that a sequence $s_1, s_2, \ldots$ is convergent with limit s_∞ if and only if the function $f(x)$ is continuous at 0, with $f(x)$ defined as follows:

$$f(x) = \begin{cases} s_1, & 1 \leq x \\ s_\infty, & x \leq 0 \\ s_n, & n \geq 2 \text{ and } 1/n \leq x < 1/(n-1) \end{cases}$$