Math 104 Homework 7 (Vaintrob)

Due Tuesday, 3/12

1 Reading Exercise 1

Read the proof of theorem 18.5: show that the condition "$g(J)$ is an interval" is necessary: find a strictly increasing function g which does not have a continuous inverse. Where is it used in the proof?

3 15.4

4 17.4

5 17.8

6 17.9

(a, b)

7 18.2

8 18.5, 18.7

9 18.10

10 Extra credit.

Prove that our definition of continuity (either one) is equivalent to the following definition: "a function $f(x)$ is continuous if and only if $f^{-1}(U)$ is open for any open $U \subset \mathbb{R}$". Here $f^{-1}(U)$ is the set of all elements $\{r \in \mathbb{R} \mid f(r) \in U\}$.