

Math 403: Classical Analysis I
Assignment 8
Due Wed 2 April

Your solutions should be written so-as to be clear to an audience of fellow math 403 students.

- Rudin, p.98 #1–4,6.
- *This is an example of a function that exhibits unusual continuity behavior.* Every rational x can be written in the form $x = m/n$, where $n > 0$, and m and n are integers without any common divisors. When $x = 0$, we take $n = 1$. Consider the function f defined on \mathbb{R}^1 by

$$f(x) = \begin{cases} 0 & \text{if } x \text{ is irrational,} \\ 1/n & \text{if } x = m/n \text{ in least common terms, as above.} \end{cases}$$

Prove that f is continuous at every irrational number, and that f is discontinuous at every rational number.