MTH 327H: Homework 7

Due: October 26, 2018

1. Office hours the seventh week of classes are M 11:30-12:30, W 3-4, and Th 9-10.

2. Read Rudin Sections 3.15-3.55

3. Do problems 1, 3, 5, 6, 7, 8, 21, and 22 in Rudin Chapter 3.

4. Prove that Rudin's definition of the limit supremum and limit infimum (Rudin 3.16) are equivalent to the definitions given in class, which are stated below for convenience.

   Definition 0.1. *Let $\{s_n\}$ be a sequence of real numbers. Let $E_N = \{s_n : n \geqslant N\}$. Then*

   $$\limsup s_n = \lim_{N \to \infty} \sup E_N \qquad\qquad \liminf s_n = \lim_{N \to \infty} \inf E_N.$$

5. (Does not need to be handed in) Go look at the mystery example from the first lecture about finding the sums of series, in which we tried a method that worked for computing $\sum_{i=0}^{\infty} \frac{1}{2^i}$ and not for $\sum_{i=0}^{\infty} 2^i$. What was the trick?