MTH 327H: Homework 9

Due: November 9, 2018

1. Office hours the eleventh week of classes are M 11:30-12:30, W 3-4, and Th 9-10.
2. Read Rudin Sections 4.22-34.
3. Do problems 2, 3, 4, 5, 6, 11 and 18 in Rudin Chapter 4.
4. For each of the following, either give an example of a surjective continuous function $f\colon M \to S$ or prove there is no such function.

   - $M = (1,2)$; $S = \mathbb{Q}$.
   - $M = (1,2)$; $S = [0,1]$.
   - $M = [0,1]$; $S = [1,2)$.
   - $M = [0,1]$; $S = \mathcal{C}([0,1], \mathbb{R})$.
   - $M = \mathbb{R}$; $S = \{(x,y) : x^2 + y^2 = 1\}$.
   - $M = (1,2) \cup (3,4)$; $S = \{0,1,2\}$.
   - $M = (0,1) \times (0,1)$; $S = \mathbb{R}$.
   - $M = \{z \in \mathbb{C} : \frac{1}{z} = \overline{z}\}$; $S = \{(x,y,z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 < 1\}$.