HOMEWORK 7 – MATH 4341
DUE DATE: MONDAY 10/23/2023

Problem 1. (a) Construct an explicit homeomorphism from any open interval $(a, b) \subset \mathbb{R}$ to the open interval $(-1, 1)$.

(b) Construct an explicit homeomorphism from any open interval $(a, b) \subset \mathbb{R}$ to $\mathbb{R}$.

Problem 2. Let $C \subset \mathbb{R}^2$ be the unit circle $x^2 + y^2 = 1$. Construct an explicit homeomorphism from $C \setminus \{(1, 0)\}$ to $\mathbb{R}$.

Problem 3. Show that the set of all irrational numbers $\mathcal{I} \subset \mathbb{R}$ is not connected.

Problem 4. Suppose that A is a connected subset of $\mathbb{R}$. Show that if $a < b$ are real numbers in A, then the closed interval $[a, b]$ is contained in A.