Math 4100 Homework 5, Spring 2023

Part 1. From Ash–Novinger, *Complex Variables*.

- Ch. 3, pp. 8–9, #4, #7, #8
- Ch. 3, p. 12, #6

Part 2.
1. (a) Give an example of a connected but not simply connected open subset of $\mathbb{C}$.
(b) Give an example of a simply connected open subset (as defined on p. 3-19 of Ash) of $\mathbb{C}$ which is not connected.

2. (extra credit) (a) Let U be an open subset of $\hat{\mathbb{C}}$. (a) Suppose U is simply connected. Show that every connected component of U is simply connected.
(b) Suppose that every connected component of U is simply connected. Is U simply connected?