Complex Analysis 1, MATH 5510, Spring 2022 Homework 3, Sections II.1 and II.2 Due Friday, February 11

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook or hypotheses.

II.1.2(b). Is the real axis $A = \{z \mid \text{Im}(z) = 0\} \subset \mathbb{C}$ is open or closed?

II.1.10. Prove Proposition 1.13. Let A, B be subsets of metric space (X, d).

- (a) A is open if and only if A = int(A).
- **II.2.4.** Let $\{D_j \mid j \in J\}$ be a collection of connected subsets of X, where (X, d) is a metric space, where for each $j, k \in J$ we have $D_j \cap D_k \neq \emptyset$. Prove that $D = \bigcup \{D_j \mid j \in J\}$ is connected. HINT: Mimic the proof of Lemma II.2.6.