Assignment 1

Due September 16, 11:59 p.m. Make sure your proofs are clear: Justify each step and use the precise definitions seen in class or in the textbook.

Problem 1

Prove the following theorem.

Theorem. For all sets $A$, $B$, $C$, and $D$, if $A \subseteq B$ and $C \subseteq D$, then $(A \cap C) \subseteq (B \cap D)$.

Problem 2

Prove the following theorem.

Theorem. For any sets $A$ and $B$, if $A \subseteq B$, then $\mathcal{P}(A) \subseteq \mathcal{P}(B)$.

Notes:

• $\mathcal{P}(A)$ stands for the power set of $A$, i.e., $\mathcal{P}(A) = \{Q \mid Q \subseteq A\}$.

• Be careful about distinguishing statements such as $x \in A$, $x \in \mathcal{P}(A)$, $x \subseteq A$, and $x \subseteq \mathcal{P}(A)$. 