Writing Assignment 5

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Foundations of Mathematics

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Theorem 3.10. Suppose that A, B and C are sets. If $A \subseteq B$ and $B \subseteq C$ then $A \subseteq C$.

Proof. Let A, B, and C be sets. Let $x \in A$. Then $x \in B$ and $x \in C$. Therefore if $(A \subseteq B) \cap (B \subseteq C)$ then $A \subseteq C$. □

Theorem 3.21b. If A and B are sets, then $(A \cap B)^c = A^c \cup B^c$.

Proof. Let A and B be sets. By definition 3.14, $(A \cap B)^c = \{x \in A \cup B : x \notin A \cap B\}$. Hence, $(A \cap B)^c = \{x \in A \cup B : x \notin A\} \cup \{x \in A \cup B : x \notin B\}$. Therefore, if $x \in (A \cap B)^c$ then $x \in A^c \cup B^c$.

□