MH3100 Quiz #6   12/12   Name: The Proof

In all problems below, A, B, and C are sets.

① True or False:

(a) If $A \cap B = \phi$, then $A - B = A$. **(3pts)**
True.

(b) If $A \supseteq B \cap C$, then $A \supseteq B$ and $A \supseteq C$. **(3pts)** **False.** (For example, let $A = \{1, 2\}$, $B = \{1, 3\}$, and $C = \{1, 4\}$. Then $B \cap C = \{1\} \subseteq A$, but $A \not\supseteq B$ and $A \not\supseteq C$.)

② Prove: If $A \subseteq B$, then $A \times C \subseteq B \times C$. **(6pts)**

(6pts) Proof. Assume $A \subseteq B$.
Need to prove: $A \times C \subseteq B \times C$.
Let $(x, y) \in A \times C$.
Then $x \in A$ and $y \in C$.
∴ $x \in B$ since $A \subseteq B$.
∴ $(x, y) \in B \times C$
∴ $A \times C \subseteq B \times C$.

Q.E.D.