Prove or disprove that:

1. $A - B \subseteq A - C - B$
2. $(A - B) \cup (B - C) \cup (C - A) = (A \cup B \cup C) - (A \cap B \cap C)$

Solution:

1. **Answer:** That is wrong.
   Let A be {1,2,3}, B={1}, C={2}. A-B={2,3}, A-C-B={3}. $\{2,3\} \not\subseteq \{3\}$.

2. **Answer:** That is true.
   Let's denote $A_1 = A - B - C$, $B_1 = B - A - C$, $C_1 = C - A - B$, $AB = A \cap B - C$, $AC = A \cap C - B$, $BC = B \cap C - A$, $ABC = A \cap B \cap C$.
   $A - B = A_1 \cup AC$, $B - C = B_1 \cup AB$, $A - C = A_1 \cup BC \implies (A - B) \cup (B - C) \cup (C - A) = A_1 \cup AC \cup B_1 \cup AB \cup A_1 \cup BC$.
   $(A \cup B \cup C) - (A \cap B \cap C) = A_1 \cup B_1 \cup C_1 \cup AB \cup BC \cup AC$.
   Thus $(A - B) \cup (B - C) \cup (C - A) = (A \cup B \cup C) - (A \cap B \cap C)$