Provide a **formal, complete** proof for each statement below.

1. $\{12a+25b : a,b \in \mathbb{Z}\} = \mathbb{Z}$.

2. If A and B are sets in a universal set U, then $\overline{A \cup B} = \overline{A} \cap \overline{B}$.

3. For every pair of sets A and B, $A \subseteq B$ if and only if $A - B = \emptyset$. (Hint: Try finding an equivalent rephrasing of the problem first.)