1. Suppose A, B, and C are sets. Prove or give a counterexample to each of the following statements:

   (a) If $B \subseteq A$, then $(A \setminus B) \cup B = A$.

   (b) If $(A \setminus B) \cup B = A$, then $B \subseteq A$.

   (c) If $B \subseteq A$, then $A \setminus (A \setminus B) = B$.

   (d) If $A \setminus (A \setminus B) = B$, then $B \subseteq A$.

   (e) $A \cup (B \triangle C) = (A \cup B) \triangle (A \cup C)$.

2. Find a function $f : \mathbf{Z} \to \mathbf{Z}$ which is

   (a) neither injective nor surjective.

   (b) injective but not surjective.

   (c) surjective but not injective.