3. Let $\sim$ and $\approx$ be two equivalence relations on a set A. We define $\equiv$ by declaring a $\equiv$ b if and only if a $\sim$ b and a $\approx$ b; and we define $\cong$ by declaring a $\cong$ b if and only if a $\sim$ b or a $\approx$ b. Determine whether $\equiv$ and $\cong$ are equivalence relations on A.

4. If a relation on A is symmetric and transitive, then it is also reflexive. Indeed, let $\sim$ be the relation and let $a \in A$. Choose an element $b \in A$ such that a $\sim$ b. Then b $\sim$ a by symmetry, and from a $\sim$ b, b $\sim$ a, it follows that a $\sim$ a, by transitivity. So a $\sim$ a for any $a \in A$ and $\sim$ is reflexive.

   This argument is wrong. Why?