Problem 1. [Category: Proof] Let us call a language $A$ star-closed iff $A = A^*$. Show that the following problem is in P: \text{STAR-CLOSED} = \{\langle M \rangle \mid M \text{ is a DFA and } L(M) \text{ is star-closed}\}.

Problem 2. [Category: Proof]

1. Prove that NP is closed under Kleene closure, i.e., if $A \in \text{NP}$ then $A^* \in \text{NP}$.
2. Prove that P is closed under Kleene closure.

Problem 3. [Category: Proof] Prove that P is closed under homomorphism iff P = NP.