1. Derive a regular expression for the language recognized by the following DFA:

   ![DFA Diagram]

   Show work clearly.

2. Derive a regular expression for the complement of the language \((ab)^*b\). The alphabet is \(\{a, b\}\).

3. Prove that the following language is not regular:

   \[
   \left\{ a^m b^n \mid m^2 \geq n \geq 0 \right\}
   \]