4. Let A be any regular language, show that A $\in$ TIME(n)

   Intuition: Every regular language can be solved in O(n) because all we need to do is read through the input once.

   Proof:

   We know that we can create a DFA from any regular language.

   We know that we can simulate any DFA with a TM

   For TM M our transition function will be as follows:

   δ: Q x $\Gamma \rightarrow$ Q x Γ x $\{R\}$

   Since a DFA can only read left to right we can restrict our TM to only move right and still be able to replicate a DFA. Therefore the complexity has to be O(n) because we can only read through the input once. Therefore any TM simulating a regular language $\in$ P.