1: Decidability

(1) Consider the problem of considering whether some NFA generates the same language that some DFA accepts. Express this problem as a language and prove that it is decidable.

(2) Let $L = \{< A, B > | A$ and B are DFAs and $L(A) \subseteq L(B)\}$. Show that L is decidable. (Hint: what would be $\overline{L(B)} \cap L(A)$ in that case, can you build a DFA for that language?)

(3) Let $A = \{< R > | R$ is a regular expression and describes a language containing **at least one string** that has 00 as a substring$\}$. Show that A is decidable.

2: Undecidability

(1) Show that the language
$A_k^\forall = \{< M, k > | M$ is a Turing Machines and it accepts all strings of length less than $k\}$ is recognizable