Facts about Regular Languages

1. Kleene’s theorem says that for a language $L$ the following are equivalent: there is DFA for $L$, there is NFA for $L$, and there is RE for $L$.

2. If $A$ and $B$ are regular languages, then so is:
   (i) the union $A \cup B$, the concatenation $AB$, the star $A^*$
   (ii) the intersection $A \cap B$, the complement of $A$

3. Examples of languages that are not regular include $0^n1^n$ and palindromes.

4. There are algorithms for the following decision problems about regular language:
   (i) For input FA/RE $M$ and string $w$, does $M$ accept/generate $w$?
   (ii) For input FA/RE $M$ and $N$, are the languages of $M$ and $N$ the same?
   (iii) For input FA/RE $M$, is its language empty? is its language everything?