1. Since $L$ is a regular language, we can construct a corresponding DFA, $M$, such that $L(M) = L$. By definition, $L^R$ consists of all strings in language $L$ in reverse order. We will construct an NFA, $M_R$, representing $L^R$ such that $L(M_R) = L^R$. $M_R$ will contain an additional start state with $\lambda$-transitions to the final states of $M$. The direction of every transition in $M$ is reversed. Also, the start state of $M$ will be the final state of $M_R$. The construction of the NFA $M_R$ is as follows:

Let $M = (Q, \Sigma, \delta, q_L, F)$

$M_R = (Q \cup \{q_0\}, \Sigma_r, \delta_r, q_0, \{q_L\})$ and $q_0 \notin Q$

$p \in \delta(q, a) \iff q \in \delta_r(p, a)$ for $a \in \Sigma$

Now we need to show that $w \in L$ iff $w^R \in L^R$

2. Let $L$ be a regular language. This implies that there exists a DFA, $M = (Q, \Sigma, \delta, q_0, F)$ which accepts $L$. We need to construct another DFA $M' = (Q, \Sigma, \delta, q_0, F')$ which accepts $\text{chopright}(L)$ from $M$. To do so, we need to make the states which can transition to the final states by one move, to the final states $F'$ of $M'$. Clearly $M'$ accepts $\text{chopright}(L)$. Hence $\text{chopright}(L)$ is regular.

$\forall \delta(q_i, a_i) = q_j : q_j \in F \implies$ remove $q_j$ from $F$ and add $q_i$ to $F$

3. $a(aa)^*(bb)^* + (aa)^*b(bb)^*$

4. (a) $(1 + 0)^*(10)$
   
   (b) $\lambda + 0 + 1 + (0 + 1)^*(00 + 01 + 11)$
   
   (c) $1^*0(1 + 01^*0)^*$

5. The NFA is as follows:

   ![NFA Diagram](image)
6. The DFA is as follows:

7. (a) $S \rightarrow aS|b$
   
   (b) $S \rightarrow S_1b$
   
   $S_1 \rightarrow S_1a|\lambda$

8. 

Figure 1: (a)  
Figure 2: (b)  
Figure 3: (c)

9. 

10. (a) The DFA is as follows:
(b) $a(aba)^*b$

(c) $S \rightarrow S_1b$

$S_1 \rightarrow S_1aba|a$