Name:_____ Grade:_____<-- instructor use

0. Here are the regular expressions and languages that they denote:

   1. $L(\varnothing) = \varnothing$.

   2. $L(\varepsilon) = \{\varepsilon\}$.

   3. *If* $c \in \Sigma$, $L(c) = \{c\}$.

   4. $L(\alpha\beta) = L(\alpha)\ L(\beta)$.

   5. $L(\alpha \cup \beta) = L(\alpha) \cup L(\beta)$.

   6. $L(\alpha^*) = (L(\alpha))^*$.

   7. $L(\alpha^+) = L(\alpha\alpha^*) = L(\alpha)\ (L(\alpha))^*$. If $L(\alpha)$ is equal to $\varnothing$, then $L(\alpha^+)$ is also equal to $\varnothing$. Otherwise $L(\alpha^+)$ is the language that is formed by concatenating together one or more strings drawn from $L(\alpha)$.

   8. $L((\alpha)) = L(\alpha)$.

1. State the Myhill-Nerode Theorem

2. Which of the above reg. exp. rules are "syntactic sugar"? (i.e., very convenient but not strictly necessary) Why?

3. Write a regular expression r such that L(r) = {$w \in$ {a, b}*: |w| is even}

4. Write a regular expression for {$w \in$ {0, 1}*: w is a binary representation of a multiple of 4}.

5. Write a regular expression r such that L(r) = {$w \in$ {a, b}*: w contains an odd number of a's}

6. $L(\ (a \cup \varepsilon)^*\ ) =$

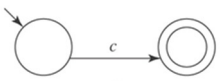
7. Write a regular expression for $L = \{w \in \{a, b\}^* :$ no two consecutive letters in w are the same$\}$

8. State Kleene's Theorem

9. Tell your instructor about anything from today's session (or from the course so far) that you found confusing or still have a question about. If none, please write "None".

∅:

A single element of Σ:



ε (∅*):