1. Create a DFA M1 for the language {w|w is a binary string with even number of 1's, starts with a 0, and when

interpreted as a number is divisible by 3}, $\Sigma = \{0,1\}$

2. Consider $r1 = (ab + cd)^* (c\varepsilon + d\emptyset)$, $\Sigma = \{a,b,c,d\}$

(a) Draw an ε-NFA M2 which accepts L(r1)

(b) Draw the corresponding DFA M3 for M2

3. Write a regular expression denoting the language of all strings over the alphabet {a,b} whose length is not

a multiple of 3.

4. Provide an algorithm for converting any ε-NFA to a corresponding NFA without epsilon transitions

5. Provide proof to Theorem 1

Theorem 1. If L is a regular language, then for some constant p and for each string $w \in L$, $|w| \geq p$ we can

rewrite w as w = xyz such that:

1. $|y| > 0$
2. $|xy| \geq p$
3. for each k = 0, 1,.... the string $xy^kz \in L$