Can we use M-N theorem to show that certain languages are not regular?

$L = \{ 0^i 1^i / i > 0 \}$. How many equivalence classes does it require in $\mathbb{R}_+$?

$x R_L y$ if $\exists z \in \mathbb{E}^* \ x R z \in L \quad \text{exactly when } y R z \in L$

$0^i \not R_L 0^{i_2} \quad i_1 \neq i_2$

Prob 5 (c) \[ L^R = \{ x^R \mid x \in L \} \]

$x^R$ is the reverse of $x$

$(a_1 a_2 a_3 a_k)^R = a_k a_{k-1} \ldots a_1$. Is $L^R$ regular?
Problem 1: A set $\mathcal{P}$ of integers is linear if it is of the form $\{c + p \cdot i \mid i \geq 0\}$ for some fixed $c, p$.

A semilinear set is a finite union of linear sets.

Let $R \subseteq \mathbb{Z}$ be a regular language. Show that $R$ is semilinear.

A DFA for linear set

DFA for $R$
7. What is the relationship between the class of regular languages and the least class of languages closed under union, intersection, complement and that contains all finite sets.

This class, say \( \mathcal{C} \), must contain all finite languages and complement of finite languages

\[
\{ L_1, L_2, \ldots \\
\overline{L_1}, \overline{L_2}, \ldots \}
\]

Is \( \mathcal{C} \) closed under union and intersection?