The mappings $[M]$ form a group (a quotient of $GL_2(\mathbb{C})$, by the appropriate homogeneity), the group of linear fractional transformations, $LF(\mathbb{C})$.

Some nice facts about $LF(\mathbb{C})$ should be recorded.

(1) We use some language in Remmert (pp. 88-89).

Suppose $G$ is a subgroup of automorphisms of a set, $S$. $S$ is <u>homogeneous</u> with respect to $G$ if, $\forall\, s, \tilde{s} \in S$, $\exists\, g \in G$ with $g(s) = \tilde{s}$.

<u>Lemma</u>: If $\exists\, c \in S$ with the <u>orbit</u> of $c$ under $G$ (this is $\{s \in S : \exists\, g \in G \text{ with } s = g(c)\}$) being all of $S$, then $S$ is homogeneous.

<u>Proof</u>: Given $s, \tilde{s} \in S$, $\exists\, g \,\&\, \tilde{g}$ with $s = g(c)$ and $\tilde{s} = \tilde{g}(c)$. Then $\tilde{g} \circ g^{-1}(s) = \tilde{s}$, so $S$ is homogeneous.

$G$ is also said to act <u>transitively</u> on $S$. $LF(\mathbb{C})$ acts transitively on $\mathbb{C}P^1$. Indeed, much more is true:

<u>Prop</u>: The action of $LF(\mathbb{C})$ on $\mathbb{C}P^1$ is triply transitive. That is given $w_1, w_2, w_3$ (all distinct) and $z_1, z_2, z_3$ (all distinct) $\exists\, [M]$ with $[M](w_j) = z_j$, $1 \leq j \leq 3$.