Let $A$ be an $m \times n$ matrix and $B$ be a $p \times m$ matrix with entries in $\mathbb{R}$. If $f : \mathbb{R}^n \to \mathbb{R}^m$ and $g : \mathbb{R}^m \to \mathbb{R}^p$ are the linear functions corresponding to these matrices, prove that the composite $g \circ f : \mathbb{R}^n \to \mathbb{R}^p$ is a linear function and that it corresponds to the matrix $BA$. 