A Simple ring is an Artenian ring with no 2-sided ideals. Let K be a field. Let V be an n-dimensional vector space over K and let A = End_K(V), the ring of n x n matrices over K. The ring is clearly Artinian since it has finite dimension over K. We want to see that the 2-sided ideal are either (0) or A. Let W be a subspace of V. Then $L_W = \{f \in A \mid f(W) = 0\}$ is clearly a left ideal of A. Let I be a left ideal, $W = \{x \in V \mid f(x) = 0$ for all $f \in I\}$, so $I \subseteq L_W$. Let $e_1, \ldots, e_n$ be a basis of V with $e_1, \ldots, e_r$ a basis of W.

Show that if f(x) has zero e_1 - coordinate for all $f \in I$, then $x \in W$. Note that if π permutes the e_i, then $\pi \circ f \in I$.