Determine whether the following statement is True or False.

1. The space $P_1$ is isomorphic to $\mathbb{C}$.
2. The space $P_2$ is isomorphic to the space of all $3 \times 3$ diagonal matrices.
3. If $W$ is a subspace of $V$ and if $W$ is finite dimensional, then $V$ must be finite dimensional as well.
4. If $T$ is a linear transformation from $P_6$ to $\mathbb{R}^{2 \times 2}$, then the kernel of $T$ must be 3-dimensional.
5. If the kernel of a linear transformation $T : P_4 \rightarrow P_4$ is $\{0\}$, then $T$ must be an isomorphism.
6. If the image of a linear transform $T : V \rightarrow V$ is all of $V$, then $T$ must be an isomorphism.
7. If the image of a linear transform $T : V \rightarrow V$ is all of $V$, then the intersection of $\text{im}(T)$ and $\text{ker}(T)$ is $\{0\}$. 

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