

**2270-2, LINEAR ALGEBRA 02/22/05**  
**TRUE OR FALSE PROBLEMS IN CHAPTER 4**

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. 3. 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  $\mathbf{im}(T)$  and  $\mathbf{ker}(T)$  is  $\{0\}$ .