

2270-2, LINEAR ALGEBRA 01/25/05
TRUE OR FALSE PROBLEMS IN CHAPTER 2

Determine whether the following statement is True or False.

1. $AB = BA$ holds for all $n \times n$ matrices A, B .
2. The formula $(A^2)^{-1} = (A^{-1})^2$ holds for all invertible matrices A .
3. If $AB = I_n$ for an $n \times p$ matrix A and $p \times n$ matrix B , then A must be invertible and B is the inverse of A .
4. If $AB = I_n$ for two $n \times n$ matrices A and B , then A must be invertible and B is the inverse of A .
5. The function $T \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} y \\ 1 \end{bmatrix}$ is a linear transformation.
6. If A is any invertible $n \times n$ matrix, then A commutes with A^{-1} .
7. If $AB = O_n$ for two $n \times n$ matrices A and B , then either $A = O_n$ or $B = O_n$.
8. The matrix $\begin{bmatrix} k & -2 \\ 5 & k-6 \end{bmatrix}$ is invertible for all real numbers k .
9. $\det(2A) = 2\det(A)$ for all 2×2 matrices A .
10. There exists an invertible $n \times n$ matrix with two identical columns.
11. There exists an invertible $n \times n$ matrix with two identical rows.
12. If $A^2 = I_2$, then A must be either $-I_2$ or I_2 .