Math 630 - Linear Algebra and Its Applications

Instructor: Prof. X. Sheldon Wang

Quiz 4
(Closed book)

Assigned: 8:00pm, Mar. 31st, 2005
Due: 9:00pm, Mar. 31st, 2005

Problem 1 (25 points)
Use row operations to calculate the determinant of the 3×3 Vandermonde matrix
\[
\begin{vmatrix}
1 & a & a^2 \\
1 & b & b^2 \\
1 & c & c^2 \\
\end{vmatrix}
\]

Problem 2 (25 points)
Use the cofactor matrix to invert
\[
A = \begin{bmatrix}
2 & -1 & 0 \\
-1 & 2 & -1 \\
0 & -1 & 2 \\
\end{bmatrix}
\]

Problem 3 (25 points)
If \( B = M^{-1}AM \), why is \( \det B = \det A \)? Show also that \( \det A^{-1}B = 1 \).

Problem 4 (25 points)
How are \( \det(2A) \), \( \det(-A) \), and \( \det(A^2) \) related to \( \det(A) \), when \( A \) is \( n \times n \)?