Math 370 Problem Set #2 Due week of Sept. 17, 2007, in lab.

Read Hoffman and Kunze, Chapter 2, Sections 1 and 2.

1. From Hoffman and Kunze, Chapter 1, pp.26-27, do problems 1, 3, 4, 6.

2. From Hoffman and Kunze, Chapter 2, do these problems:
Page 33, #3; p.39 # 1-3.

3. Let $A$ be an $n \times n$ lower triangular matrix. Suppose that $B$ is an $n \times n$ matrix such that $AB$ is the $n \times n$ identity matrix. Prove that

(i) $B$ is also lower triangular.

(ii) the diagonal elements of $A$ are all non-zero.

[Hint: First do this with $n = 2$, and then do $n = 3$. In general you may wish to use induction.]

4. Prove that the functions $e^x, e^{2x}, e^{3x}$ are linearly independent in the real vector space $V$ consisting of differentiable functions.
[Hint: If not, then differentiate twice.]