Math 370 Problem Set #1 Due week of Jan. 20, 2014, in lab.

Read Hoffman and Kunze, Chapter 1.

1. From Hoffman and Kunze, do these problems:
Page 10, #2; page 11, #3; page 15, #1; p.16 #6,7.

2. (a) Let A be a square matrix satisfying $A^2 + 3A - I = 0$. Show that A is invertible, and find a formula for A^{-1} in terms of A. [Hint: By *inspection*, find a matrix B such that $AB = BA = I$.]

(b) Let B be a square matrix satisfying $B^4 = 0$. Show that B is not invertible, but that $I - B$ is invertible, and find a formula for $(I - B)^{-1}$ in terms of B. [Hint: $1/(1 - x) = 1 + x + x^2 + x^3 + \cdots$.]

3. Let $A = \begin{pmatrix} 1 & -1 & 1 \\ 1 & 1 & 0 \\ 0 & 2 & c \end{pmatrix}$, where c is a real number.

a) Find A^{-1} using row reduction.

b) *Using* part (a), determine for which real numbers c there is no inverse for A.