CCB 421/521: Homework 5

Due in class on Thursday, March 31. (Note: these are problems from the book; I'm posting them here because the electronic/Kindle version of the text seems to have lots of typos. Let's hope I don't make typos myself!)

(A5-11) Find the inverse of the matrix

$$\begin{bmatrix} 1 & 0 & -1 \\ 2 & -3 & 2 \\ 1 & 1 & 4 \end{bmatrix}$$

(A5-12) Prove that if $\mathbf{AB} = \mathbf{C}$, where $\mathbf{A}$ and $\mathbf{B}$ are non-singular matrices, then $\mathbf{C}^{-1} = \mathbf{B}^{-1}\mathbf{A}^{-1}$. *Hint:* Multiply both sides on the left by $\mathbf{B}^{-1}\mathbf{A}^{-1}$ and then on the right by $\mathbf{C}^{-1}$.

(A5-13) Prove that if $\mathbf{AB} = \mathbf{C}$, then $\mathbf{B}^T\mathbf{A}^T = \mathbf{C}^T$ (where "T" indicates transpose). Note the similarity to the corresponding relation for operators and their adjoints.

(A5-15) Show that the trace of a product of matrices is invariant to a cyclic permutation of the the matrices, that is that

$$tr\,(\mathbf{ABCD}) = tr\,(\mathbf{BCDA}) = tr\,(\mathbf{DABC})$$