Additional Homework Problem

October 26, 2005

Exercise 1.

a. Find the system of linear equations satisfied by a, b, c, d if

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} -4 & -5 \\ 2 & -2 \end{pmatrix} = \begin{pmatrix} -4 & -5 \\ 2 & -2 \end{pmatrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix}.$$

b. Solve the system of equations found in part (a).

c. Let

$$A = \begin{pmatrix} -4 & -5 \\ 2 & -2 \end{pmatrix}$$

and let $\mathcal{W}$ be the set of all 2×2 matrices X so that $XA = AX$. In class we showed that $\mathcal{W}$ is a subspace of $\mathcal{M}_{2\times 2}$. Use your results from part (b) to find a basis for $\mathcal{W}$.