

Math 220 Assignment

October 5, 2001

Due Monday, October 8

1. Find the inverse of the matrix

$$\begin{pmatrix} 1 & 2 & -4 & 1 \\ -2 & 10 & -1 & 1 \\ 1 & 0 & 1 & 5 \\ 2 & -9 & 1 & 0 \end{pmatrix}.$$

2. Let f be the linear map from \mathbf{R}^4 to \mathbf{R}^4 that is given by the matrix

$$\begin{pmatrix} 1 & 2 & -4 & 7 \\ -2 & -1 & -1 & -8 \\ -1 & 4 & -14 & 5 \\ 5 & 7 & -11 & 29 \end{pmatrix}.$$

In this example it will be observed that the reduced row echelon form of the matrix M has only two non-zero rows. We shall come to understand that in this situation both the kernel of f and the image of f are 2-dimensional. Some who teach linear algebra regard this scene as a *pons asinorum*.

- (a) Obtain a parametric representation for the kernel of f .
- (b) Find a pair of equations in 4 variables that characterize the image of f .
- (c) List a pair of equations in 4 variables that characterize the kernel of f .
- (d) Give a parametric representation for the image of f .

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<http://math.albany.edu:8000/math/pers/hammond/course/mat220/assgt/1a011005.html>