Math 220 Assignment

October 1, 2001

Due Wednesday, October 3

1. Let f be the linear map given by $f(x) = Mx$ where M is the matrix

$$\begin{pmatrix} 1 & 5 & -2 \\ -2 & 4 & -3 \\ -1 & -3 & 1 \end{pmatrix} .$$

   (a) Find the fibre of f over the origin.

   (b) Find the fibre of f over the point $(1, -5, 3)$.

   (c) Find the fibre of f over the point $(-1, 2, 1)$.

   (d) Find the set of all points y of $\mathbf{R}^3$ for which the fibre of f over y is non-empty.

2. Let g be the linear map given by $g(y) = Ny$ where N is the matrix

$$\begin{pmatrix} 1 & 2 & 0 & 2 \\ -2 & -1 & 3 & 2 \\ -2 & 2 & 6 & -1 \\ 1 & 0 & -2 & 0 \end{pmatrix} .$$

   (a) Find the fibre $g^{-1}(0)$.

   (b) Find the fibre $g^{-1}(1, -2, -2, 1)$.

   (c) Find the fibre $g^{-1}(-1, -7, 2, 1)$.

   (d) Find equations that characterize the set of all x in $\mathbf{R}^4$ for which $g^{-1}(x)$ is non-empty.

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`http://math.albany.edu:8000/math/pers/hammond/course/mat220/assgt/la011001.html`