MATRIX ALGEBRA HOMEWORK 3
ADDITIONAL PROBLEMS

2005 SPRING

(1) Find the matrix for the projection onto the xy–plane in $\mathbb{R}^3$. i.e. the linear transformation $R : \mathbb{R}^3 \to \mathbb{R}^3$ defined by

$$R\left(\begin{bmatrix} x \\ y \\ z \end{bmatrix}\right) = \begin{bmatrix} x \\ y \\ 0 \end{bmatrix}.$$

(2) Give a geometric description of the linear transformation defined by

$$S(\mathbf{x}) = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix} \mathbf{x}$$

(3) Give a geometric description of the linear transformation defined by

$$T(\mathbf{x}) = \begin{bmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix} \mathbf{x}$$