1. Compute the inverses of the following matrices.

(a) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 2 & -1 \end{bmatrix}$

2. Find all linear transformations from $\mathbb{R}^2$ to $\mathbb{R}^2$. so that T(1,3)=(1,0) and T(2,4)=(0,1), check out problem 2.4.76 for a hint.

3. True or False?

(a) If A is an nxn matrix with rank(a)< n, then A is not invertible.

(b) If A is an nxm matrix, with rank(A)=n, then A is invertible.

(c) If A is an invertible matrix then its transpose is invertible.

4. Find the determinants of the following matrices, conclude whether the matrices are invertible.

(a) $\begin{bmatrix} 1 & 5 \\ 4 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 1/2 & 2 \\ 1 & 4 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$

5. Find the inverse of the matrix corresponding to rotation counter clockwise by θ in $\mathbb{R}^2$. Interpret geometrically.

6. Find which projection matrices are invertible. Interpret geometrically.