

Math 307 Homework
September 28, 2015

1. Find bases for each of the following spaces:

(a) $\left\langle \begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 0 \\ -3 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \\ 3 \end{bmatrix}, \begin{bmatrix} 1 \\ -3 \\ 3 \end{bmatrix} \right\rangle$

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

2. Show that theorem 2.13 fails if the vectors in V are not linearly independent.
3. Suppose that (v_1, \dots, v_n) is a basis for V , $\mathbf{T} : V \rightarrow W$ is linear, and $(\mathbf{T}v_1, \dots, \mathbf{T}v_n)$ is a basis for W .

Prove that if (u_1, \dots, u_n) is another basis for V , then $(\mathbf{T}u_1, \dots, \mathbf{T}u_n)$ is another basis for W .