

Homework #4  
Due Wednesday October 14  
No late papers accepted! No excuses!

1. Determine whether the set of vectors  $\left\{ v_1 = \begin{bmatrix} 2 \\ -3 \\ 1 \end{bmatrix}, v_2 = \begin{bmatrix} 1 \\ 2 \\ -4 \end{bmatrix}, v_3 = \begin{bmatrix} 7 \\ 0 \\ -10 \end{bmatrix} \right\}$  is linearly independent or linearly dependent. Find a basis of  $\text{span}(v_1, v_2, v_3)$ .

2. Find the dimension of the null space of the given matrix A.

$$A = \begin{bmatrix} 1 & -1 & 2 & 3 \\ 2 & -1 & 3 & 4 \\ 1 & 0 & 1 & 1 \\ 3 & -1 & 4 & 5 \end{bmatrix}$$

3. Determine whether or not the set  $S$  is a basis for the specified vector space  $V$ .

$$V = P_4$$

$$S = \{t^4, t+3, t^3+4, t-1, t^2-5t+1\}$$

4. Prove that if  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$  is linearly independent and  $\vec{v}_4$  is not in the span  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$ , then  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4\}$  is linearly independent.