

## Math 300 Section 2.2 Additional Problems

1. Show that  $\begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$ ,  $\begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$ ,  $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ ,  $\begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$  form a basis for  $M(2, 2)$ .
2. Show that  $x^2 + x - 1$ ,  $x^2 - x + 1$  and  $x^2 - 1$  form a basis for  $\mathbb{P}_2$ .
3. Show that  $x + 1$ ,  $x + 2$ , and  $x + 3$  do not form a basis for  $\mathbb{P}_2$ .
4. In each part, determine whether the given vectors form a basis for  $\mathbb{R}^2$ .
  - a)  $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$
  - b)  $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ ,  $\begin{bmatrix} 2 \\ -1 \end{bmatrix}$
  - c)  $\begin{bmatrix} -12 \\ 16 \end{bmatrix}$ ,  $\begin{bmatrix} 9 \\ -12 \end{bmatrix}$
  - d)  $\begin{bmatrix} -2 \\ -7 \end{bmatrix}$ ,  $\begin{bmatrix} 4 \\ 3 \end{bmatrix}$ ,  $\begin{bmatrix} -5 \\ 8 \end{bmatrix}$