Assignment 6 ***Math 260*** ***Name:***

1. Find a linearly independent minimal set that spans span(S).

a) $S = \left\{ \begin{bmatrix} 2 \\ -1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}; \begin{bmatrix} 1 \\ 4 \\ -9 \end{bmatrix}; \begin{bmatrix} 3 \\ 3 \\ -9 \end{bmatrix} \right\}$

b) $S = \left\{ 3x^2 - 2x + 1, 4x^2 - 3, x^2 - 6x + 9, 4x^2 - 8x + 10 \right\}$

c) $S = \left\{ \begin{bmatrix} -1 & 1 \\ 0 & 2 \end{bmatrix}; \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}, \begin{bmatrix} -7 & 4 \\ -3 & -6 \end{bmatrix}, \begin{bmatrix} 2 & 0 \\ 2 & 4 \end{bmatrix}; \begin{bmatrix} -6 & 4 \\ -2 & -4 \end{bmatrix} \right\}$

2. Find a basis and dimension of the following vector spaces:

a) $V = \left\{ \begin{bmatrix} a \\ b \\ c \end{bmatrix} \in R^3 \middle| 3a - 2b + c = 0 \right\}$

b) $V = \left\{ A \in M_2(R) \middle| A^T = A \right\}$

c) $V = \left\{ f(x) \in P_2 \middle| \int_0^1 f(x)\,dx = 0 \right\}$

d) $V=\left\{f(x)\in P_3 \middle| f(0)+f'(1)+f''(2)=0\right\}$

e) $V = Null\ space\ of\ A = NullSpace(A)\ where\ A=\begin{bmatrix} 3 & -1 & 1 \\ 5 & 0 & 5 \\ 2 & 1 & 4 \\ 1 & -2 & -3 \end{bmatrix}$

3. Find a basis of the following subspace S and then extend their basis to be a basis of vector space V.

a) $S = span\left\{ \begin{bmatrix} 3 \\ -1 \\ 2 \\ -3 \end{bmatrix}, \begin{bmatrix} 7 \\ -5 \\ 4 \\ -3 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 10 \\ -6 \\ 6 \\ -6 \end{bmatrix} \right\}$

b) $S = \left\{ y \in P_3 \middle| y(0) + y'(1) = 0 \right\}$

c) $S=\left\{A\in M_2\left(R\right)\middle| A^T=A\right\}$

d) $S=span\left\{1+x+2x^3, 2+x+3x^2-x^3, -1+x+x^2-2x^3, 2-x+x^2+2x^3\right\}$