

i) (20 Points) Find the basis for and the dimension of the subspace  $W$  of  $R^4$  spanned by the vectors

$$\begin{bmatrix} 1 \\ -1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ -3 \\ 1 \\ 6 \end{bmatrix}, \begin{bmatrix} -2 \\ 0 \\ 1 \\ 3 \end{bmatrix}, \begin{bmatrix} -5 \\ 1 \\ 2 \\ 5 \end{bmatrix}$$

ii) (5 Points) Let  $V$  be a vector space of dimension 6 and  $W$  be a subspace of dimension 4. Suppose  $W'$  is a subspace of  $V$  containing  $W$ , find the possible values of  $\dim(W')$ .