







5. (5%)

(a) (3%) Apply Gram-Schmidt orthonormalization process on the subspace of  $\mathbb{R}^4$  defined as

$$W = \text{span} \left\{ [1 \ 1 \ 1 \ 1]^T, [1 \ 1 \ 0 \ 0]^T, [2 \ 0 \ 1 \ -1]^T \right\}$$

and give an orthonormal basis for  $W$ .(b) (2%) Find an orthonormal basis for  $W^\perp$ , the orthogonal complement of  $W$ .6. (5%) Let  $A = \begin{bmatrix} 5 & -4 & 2 \\ 8 & -8 & 6 \\ 4 & -4 & 3 \end{bmatrix}$ . Calculate  $A^{10000}$ . (Hint: First find eigenvalues and eigenvectors of  $A$ .)