1. Let $A = \begin{bmatrix} -5 & -6 & -6 \\ 5 & 6 & 6 \\ 1 & 0 & 2 \\ 1 & 3 & 0 \end{bmatrix}$ and let $\mathbf{b} = \begin{bmatrix} 7 \\ -7 \\ -7 \\ 7 \end{bmatrix}$.

1A. Find a set of vectors that spans $\mathrm{Col}(A)$.

1B. Is $\mathbf{b}$ in $\mathrm{Col}(A)$? Explain.

1C. Does $\mathrm{Col}(A) = \mathbf{R}^4$? Explain.

1D. Find a set of vectors that spans $\mathrm{Nul}(A)$.

1E. Suppose $T : \mathbf{R}^3 \to \mathbf{R}^4$ is a linear transformation and A is its matrix. Is T one-to-one? Explain.

2. Let B be the 3 by 4 matrix all of whose entries are zeros.

2A. $\mathrm{Col}(B)$ is a subspace of $\mathbf{R}^p$ for what value of p? Explicitly, what is $\mathrm{Col}(B)$ in this example? Explain!

2B. $\mathrm{Nul}(B)$ is a subspace of $\mathbf{R}^d$ for what value of d? Explicitly, what is $\mathrm{Nul}(B)$ in this example? Explain!