Exercise 1

1. Let $\bar{u} = \begin{pmatrix} -6 \\ -7 \\ 8 \end{pmatrix}$ and $\bar{v}_1 = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}, \bar{v}_2 = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}, \bar{v}_3 = \begin{pmatrix} 1 \\ 0 \\ 3 \end{pmatrix}$.

    1.1. Write $\bar{u}$ as a linear combination of $\bar{v}_1, \bar{v}_2, \bar{v}_3$.

    1.2. Can $\bar{v}_1$ be written as a linear combination of $\bar{v}_2, \bar{v}_3$? Justify your answer.

2. Let $\bar{u} = \begin{pmatrix} 7 - 2i \\ 2 + 5i \end{pmatrix}, \bar{v} = \begin{pmatrix} 1 + i \\ -3 - 6i \end{pmatrix}$

    1.1. Find $\bar{u} + 2i\bar{v}$

    1.2. Find $\bar{u}^{*T}\bar{v}$

    1.3. Find $|\bar{u}|$