Problem 1: Let \(z, w \in \mathbb{C}\). Assume that \(|z| = 3\) and \(|w| = 5\). Is it possible that \(|z + w| = 9\)? Is it possible that \(|z + w| = 7\)?

Problem 2: Are the vectors \((1, 0, 9), (1, 1, -2), (0, -3, -2)\) linearly independent?

Problem 3: Is the set \(\{x \in \mathbb{R}^3 : x_1 = 1\}\) a subspace?

Problem 4: Find an orthonormal basis for \(S = \{x \in \mathbb{R}^3 : x_1 + x_2 = 0\}\). What is the dimension of \(S\)?

Problem 5: Let
\[
A = \begin{bmatrix}
1 & 0 & -1 \\
0 & -2 & 3 \\
2 & 2 & 0
\end{bmatrix}.
\]
Compute \(A^{-1}\).

Problem 6: Find the eigenvalues and eigenvectors of
\[
A = \begin{bmatrix}
1 & -1 \\
1 & -2
\end{bmatrix}.
\]