Problem 1  Given the following system of equations:

\[ 3x + 2y - 5z = 1 \]
\[ 4x - y + z = 0 \]
\[ x - z = 2 \]

find all solutions using Gauss-Jordan elimination procedure. Is this an example of consistent system? Why?

Problem 2  Find the rank of the following matrix

\[
\begin{pmatrix}
-1 & 3 & 8 & -2 & 1 \\
-1 & 3 & 9 & -1 & 3 \\
1 & -3 & -9 & 1 & -3 \\
0 & 0 & 0 & 0 & 2
\end{pmatrix}
\]

Problem 3  In a certain sense, the following system is not linear:

\[ 2 \sin \alpha - \cos \beta + 3 \tan \gamma = 3 \]
\[ 4 \sin \alpha + 2 \cos \beta - 2 \tan \gamma = 10 \]
\[ 6 \sin \alpha - 3 \cos \beta + \tan \gamma = 9. \]

However, there is still a way to do Gauss-Jordan elimination on it. Does a solution exist for \( \alpha, \beta, \) and \( \gamma? \)