1. Determine whether the vectors \( v_1 = (5,1,2,3) \), \( v_2 = (1,-1,0,1) \), \( v_3 = (1,2,1,0) \) are linearly dependent or independent.

2. Find a basis and the dimension of the solution space of the system:

\[
\begin{align*}
    x_1 - 3x_2 + 2x_3 - 4x_4 &= 0 \\
    2x_1 - 5x_2 + 7x_3 - 3x_4 &= 0
\end{align*}
\]