1. Show that the vector \( \mathbf{u} = (-1, 1, 0, 2) \) is in the orthogonal complement of \( W = \text{span} \{(6, 2, 7, 2), (1, 1, 3, 0), (4, 0, 9, 2)\} \).

2. Find a basis for \( W = \text{span} \{(1, 1, -3), (5, -4, -4), (7, -6, 2)\} \). Also find a basis for \( W^\perp \).

3. Determine the conditions satisfied by a vector \( \mathbf{b} \) in order to lie in \( W = \text{span} \{(1, 1, 0, 0), (0, 0, 1, 1), (-2, 0, 2, 2), (4, 2, -1, -1)\} \).

4. Find a basis for the row space of the matrix \( A = \begin{bmatrix} -1 & 3 & 3 & 2 \\ 2 & 0 & 6 & 1 \\ -2 & 4 & 2 & 4 \end{bmatrix} \).

5. Construct a matrix whose null space is the span of the vectors \( \text{span} \{(1, -1, 3, 2), (2, 0, -2, 4)\} \).

6. Find a subset of the vectors \( \{(1, -2, 0, 3), (2, -4, 0, 6), (-1, 1, 2, 0), (0, -1, 2, 3)\} \) that forms a basis for the space spanned by the vectors.