1. Define "basis". Use complete sentences. The vectors \( \mathbf{v}_1, \ldots, \mathbf{v}_n \) are a basis for the vector space \( V \) if \( \mathbf{v}_1, \ldots, \mathbf{v}_n \) are linearly independent and \( \mathbf{v}_1, \ldots, \mathbf{v}_n \) span \( V \).

2. Define "null space". Use complete sentences. The null space of the matrix \( A \) is the set of all vectors \( \mathbf{x} \) with \( A\mathbf{x} = \mathbf{0} \).

3. Complete the following definition. The vectors \( \mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n \) span the vector space \( V \), if \( \mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n \) are in \( V \) and every vector in \( V \) is equal to a linear combination of \( \mathbf{v}_1, \ldots, \mathbf{v}_n \).