1. Let \( b \) and \( v_1, v_2, \ldots, v_n \) be vectors in \( \mathbb{R}^m \). Complete the following sentence so that it gives the definition of linear combination: 

"We say \( b \) is a linear combination of the vectors \( v_1, v_2, \ldots, v_n \) if and only if..."

2. Let \( a_1 = \begin{bmatrix} 2 \\ 1 \\ -3 \end{bmatrix}, a_2 = \begin{bmatrix} 6 \\ 3 \\ -9 \end{bmatrix}, a_3 = \begin{bmatrix} 1 \\ 0 \\ 4 \end{bmatrix}, a_4 = \begin{bmatrix} 10 \\ 4 \\ -4 \end{bmatrix}. \) Also, let \( b = \begin{bmatrix} 16 \\ 8 \\ 26 \end{bmatrix} \) and \( c = \begin{bmatrix} 26 \\ 8 \end{bmatrix} \). 

2A. Is \( b \) in the span of \( \{ a_1, a_2, a_3, a_4 \} \)? Explain your answer. Show any matrices and corresponding rref’s you use.

2B. Let \( A \) be the matrix whose columns are \( a_1, a_2, a_3, a_4 \). Express all solutions of \( Ax = c \) in parametric vector form, that is, as \( p + v_h \) where \( p \) is a particular solution of \( Ax = c \) and \( v_h \) is all solutions of the corresponding homogeneous equation \( Ax = 0 \). Show any relevant matrices used in your work.

2C. Use your work in (2B) to find two nontrivial solutions \( s_1 \) and \( s_2 \) of \( Ax = 0 \). CIRCLE your answers.

2D. Now let \( T \) be the matrix whose columns are \( a_1, a_3, a_4 \) (so \( T \) looks like \( A \) if you take out \( A \)'s second column). What is \( v_h \) now? That is, what are the solutions of \( Tx = 0 \)?