Name: **Tutorial day and time:**

Select one *completed* problem for feedback:

1. Determine the rank of each of the following matrices:

(a) $A = \begin{bmatrix} 2 & -3 & 1 & 4 \\ -1 & 3 & 5 & -7 \\ 1 & 0 & 6 & -3 \end{bmatrix}$ (b) $B = \begin{bmatrix} 2 & 6 \\ 5 & -3 \\ 3 & 2 \end{bmatrix}$

2. Determine the basic solutions of the homogeneous system of equations

$$\begin{array}{rcrcrcrcl} 2x_1 & - & 3x_2 & & & - & 4x_4 & = & 0 \\ -x_1 & + & 2x_2 & - & x_3 & + & 3x_4 & = & 0 \\ 3x_1 & - & 4x_2 & - & x_3 & - & 5x_4 & = & 0 \end{array}$$

3. Determine whether or not the vectors

$$\vec{v}_1 = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} 0 \\ 1 \\ -4 \end{bmatrix}, \quad \text{and} \quad \vec{v}_3 = \begin{bmatrix} 3 \\ -1 \\ 5 \end{bmatrix}$$

are linearly independent.

4. Determine whether or not $\vec{w} \in \text{span}\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$, where

$$\vec{v}_1 = \begin{bmatrix} 1 \\ 0 \\ 2 \\ -1 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} 2 \\ 1 \\ 0 \\ -3 \end{bmatrix}, \vec{v}_3 = \begin{bmatrix} -2 \\ 0 \\ -4 \\ 1 \end{bmatrix}, \quad \text{and} \quad \vec{w} = \begin{bmatrix} 2 \\ 3 \\ -8 \\ 6 \end{bmatrix}.$$