Instructions:

- Print out this page as a cover one.
- Write your name and PSID in the spaces provided above.
- Your homework must be complete, neatly written, and stapled.
- Use a pen or a dark pencil.
- For the MATLAB exercises, send the scripts to yushutin@math.uh.edu. For homework n, write “lastname, firstname - homework n” as the subject of your email. Call “lastname_hwn_1” the script generated for exercise 1, “lastname_hwn_2” the script generated for exercise 2 and so on, where lastname is your last name.

Exercises from the book:

- Section 4.1: exercises 2, 6, 12, 21.
- Section 4.2: exercises 2, 18, 25, 33.

MATLAB exercises:
Create a script for the following exercises:

1. Determine if \( \mathbf{w} \) is in the subspace of \( \mathbb{R}^4 \) spanned by \( \mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3 \), where:

\[
\mathbf{w} = \begin{bmatrix} 9 \\ -4 \\ -4 \\ 7 \end{bmatrix}, \quad \mathbf{v}_1 = \begin{bmatrix} 8 \\ -4 \\ -3 \\ 9 \end{bmatrix}, \quad \mathbf{v}_2 = \begin{bmatrix} -4 \\ 3 \\ -2 \\ 8 \end{bmatrix}, \quad \mathbf{v}_3 = \begin{bmatrix} -7 \\ 6 \\ -5 \\ -18 \end{bmatrix}.
\]

2. Let \( H = \text{Span}\{\mathbf{u}_1, \mathbf{u}_2, \mathbf{u}_3\} \) and \( K = \text{Span}\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3\} \), where:

\[
\mathbf{u}_1 = \begin{bmatrix} 1 \\ 2 \\ 0 \\ -1 \end{bmatrix}, \quad \mathbf{u}_2 = \begin{bmatrix} 0 \\ 2 \\ -1 \\ 1 \end{bmatrix}, \quad \mathbf{u}_3 = \begin{bmatrix} 3 \\ 4 \\ 1 \\ -4 \end{bmatrix}, \quad \mathbf{v}_1 = \begin{bmatrix} -2 \\ -2 \\ -1 \\ 3 \end{bmatrix}, \quad \mathbf{v}_2 = \begin{bmatrix} 2 \\ 3 \\ 2 \\ 6 \end{bmatrix}, \quad \mathbf{v}_3 = \begin{bmatrix} -1 \\ 4 \\ 2 \\ -2 \end{bmatrix}.
\]

Find bases for \( H, K, \) and \( H + K \).