Math 250 Linear Algebra Quiz for Lecture #3

Name (print): _____ **ID (last 4 digits):** _____

1. Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 0 \\ -6 & 7 \end{bmatrix}$ and $= \begin{bmatrix} 4 \\ 5 \end{bmatrix}$. Fill in the blanks with the correct numbers:

$$A = \_\_\_\_ \begin{bmatrix} 1 \\ 3 \\ -6 \end{bmatrix} + \_\_\_\_ \begin{bmatrix} 2 \\ 0 \\ 7 \end{bmatrix} = \begin{bmatrix} \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \end{bmatrix}$$

2. Write the vector on the left as a linear combination of the two vectors on the right:

$$\begin{bmatrix} 7 \\ 9 \\ -4 \end{bmatrix} = \_\_\_\_ \begin{bmatrix} 1 \\ 3 \\ -6 \end{bmatrix} + \_\_\_\_ \begin{bmatrix} 2 \\ 0 \\ 7 \end{bmatrix}$$

3. Suppose B is a 2×3 matrix and $, \in^3$ are vectors such that $B = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Then $B(5 - 6) = \begin{bmatrix} \_\_\_\_ \\ \_\_\_\_ \end{bmatrix}$ (fill in the correct numbers).

4. Consider the system of equations $\begin{cases} x_1 + 3x_2 - 2x_4 = 5 \\ x_3 + 4x_4 = 6 \end{cases}$ for the vector $\in^4$.

(a) Write down the **augmented matrix** of this system.

(b) What are the **free variables** for the system?

(c) Write down the **general solution vector** to this system. Express each entry in in terms of constants and the free variables.

$$= \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} \_\_\_\_\_ \\ \_\_\_\_\_ \\ \_\_\_\_\_ \\ \_\_\_\_\_ \end{bmatrix}$$