Sample Quiz 5: Section 3.3, 3.4
Math 1090-001 (Summer 2001) Thursday June 14, 2001

NOTE: The Quiz 5 will cover only two sections 3.3 and 3.4 !!

1. Write the augmented matrix of the following system

\[
\begin{cases}
3x + 2y + 4z = 2 \\
2x - y + 2z = 3 \\
x - 2y - 4z = -1
\end{cases}
\]

ANSWER:

\[
\begin{bmatrix}
3 & 2 & 4 & | & 2 \\
2 & -1 & 2 & | & 3 \\
1 & -2 & -4 & | & -1
\end{bmatrix}
\]

2. (Unique solutions) For a given augmented matrix, find the solutions of the system.

\[
\begin{bmatrix}
1 & 0 & 0 & | & 2 \\
0 & 1 & 0 & | & 1/2 \\
0 & 0 & 1 & | & -5
\end{bmatrix}
\]

ANSWER: \(x = 2, y = 1/2, z = -5\)

3. (Non-Unique solutions) For a given augmented matrix, find the solutions of the system.

\[
\begin{bmatrix}
1 & 0 & \frac{-2}{3} & | & \frac{11}{3} \\
0 & 1 & \frac{1}{3} & | & \frac{-1}{3} \\
0 & 0 & 0 & | & 0
\end{bmatrix}
\]

ANSWER: \(x = \frac{2}{3}z + \frac{11}{3}, y = -\frac{1}{3}z - \frac{1}{3}, \) and \(z\) is arbitrary. So there are infinitely many numbers of solutions.

4. Given a system of equation

\[
\begin{cases}
6x + 7y = 55 \\
5x - 37y = 3
\end{cases}
\]

a) Write the augmented matrix of the system. ANSWER:

\[
\begin{bmatrix}
6 & 7 & | & 55 \\
5 & -37 & | & 3
\end{bmatrix}
\]

b) Use row operation to find the solution. ANSWER: \(x = 8, y = 1\).

5. What is the inverse of

\[ A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix} \]

? ANSWER

\[
\begin{bmatrix}
1/3 & 0 & 0 \\
0 & 1/3 & 0 \\
0 & 0 & 1/3
\end{bmatrix}
\]
6. Use inverse matrix to solve the equations

\[
\begin{align*}
    x + y &= 2 \\
    2x - y &= 1
\end{align*}
\]

ANSWER: \( x = 1, y = 1 \)