

Math 202 Quiz # 7e

Name: _____ Section # _____ Serial # _____

Use Gauss-Jordan reduction method to solve the following system:

$$2y + z = 1$$

$$x - y + z = 5$$

$$x + y - 2z = -6$$

Solution:

$$\begin{bmatrix} 0 & 2 & 1 & 1 \\ 1 & -1 & 1 & 5 \\ 1 & 1 & -2 & -6 \end{bmatrix} R_1 \leftrightarrow R_3 \quad \begin{bmatrix} 1 & 1 & -2 & -6 \\ 1 & -1 & 1 & 5 \\ 0 & 2 & 1 & 1 \end{bmatrix}$$

$$\xrightarrow{-R_1+R_2} \begin{bmatrix} 1 & 1 & -2 & -6 \\ 0 & -2 & 3 & 11 \\ 0 & 2 & 1 & 1 \end{bmatrix} \xrightarrow[\frac{1}{2}R_2]{R_2+R_3} \begin{bmatrix} 1 & 1 & -2 & -6 \\ 0 & 1 & -\frac{3}{2} & -\frac{11}{2} \\ 0 & 0 & 4 & 12 \end{bmatrix}$$

$$\xrightarrow{\frac{1}{4}R_3} \begin{bmatrix} 1 & 1 & -2 & -6 \\ 0 & 1 & -\frac{3}{2} & -\frac{11}{2} \\ 0 & 0 & 1 & 3 \end{bmatrix}$$

$$\xrightarrow[\frac{3}{2}R_3+R_2]{-R_2+R_1} \begin{bmatrix} 1 & 0 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 3 \end{bmatrix}$$

$$\xrightarrow{\frac{1}{2}R_3+R_1} \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 3 \end{bmatrix}$$

The solution is

$$x = 1$$

$$y = -1$$

$$z = 3$$