

Directions: Please answer in the space provided. Please show all of your work and indicate your row operations. No calculators. Please put all phones, etc., away.

1. Use either *Gaussian Elimination* or *Gauss-Jordan Elimination* to solve the following system.

$$\begin{cases} x & & - 3z & = & -2 \\ 3x & + & y & - & 2z & = & 5 \\ 2x & + & 2y & + & z & = & 4 \end{cases}$$

$$\begin{bmatrix} 1 & 0 & -3 & -2 \\ 3 & 1 & -2 & 5 \\ 2 & 2 & 1 & 4 \end{bmatrix} \begin{array}{l} R_2 - 3R_1 \rightarrow R_2 \\ R_3 - 2R_1 \rightarrow R_3 \end{array} \rightarrow \begin{bmatrix} 1 & 0 & -3 & -2 \\ 0 & 1 & 7 & 11 \\ 0 & 2 & 7 & 8 \end{bmatrix}$$

$$\begin{array}{l} R_3 - 2R_2 \rightarrow R_3 \\ \rightarrow \end{array} \begin{bmatrix} 1 & 0 & -3 & -2 \\ 0 & 1 & 7 & 11 \\ 0 & 0 & -7 & -14 \end{bmatrix}$$

$$\begin{array}{l} -\frac{1}{7}R_3 \rightarrow R_3 \\ \rightarrow \end{array} \begin{bmatrix} 1 & 0 & -3 & -2 \\ 0 & 1 & 7 & 11 \\ 0 & 0 & 1 & 2 \end{bmatrix}$$

$$\begin{array}{l} R_1 + 3R_3 \rightarrow R_1 \\ R_2 - 7R_3 \rightarrow R_2 \\ \rightarrow \end{array} \begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 2 \end{bmatrix}$$

Solution: $\begin{cases} x = 4 \\ y = -3 \\ z = 2 \end{cases}$ i.e. $(4, -3, 2)$