

Math 202 Quiz # 8-b

Name: \_\_\_\_\_ Section # \_\_\_\_\_ Ser. # \_\_\_\_\_

1. If  $\begin{bmatrix} 1 & -3 & 4 \\ 2 & 5 & -1 \\ 0 & -4 & -2 \end{bmatrix} \begin{bmatrix} t \\ 2t-1 \\ -t \end{bmatrix} + \begin{bmatrix} -t \\ 1 \\ 4 \end{bmatrix} - \begin{bmatrix} 2 \\ 8 \\ -6 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ , express  $t$  in terms of  $z$ .

$$\begin{bmatrix} t-6t+3-4t \\ 2t+10t-5+t \\ -8t+4+2t \end{bmatrix} + \begin{bmatrix} -t+2 \\ 1-8 \\ 4+6 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

$$\begin{bmatrix} -10t+1 \\ 13t-12 \\ -6t+14 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

$$\Rightarrow -6t+14 = z$$

$$t = \frac{14-z}{6}$$

2. Solve the following system:  $5x_1 + 4x_2 - 16x_3 = -10$

$$x_2 + x_3 = -5$$

$$x_1 - x_2 - 5x_3 = 7$$

$$\left[ \begin{array}{ccc|c} 5 & 4 & -16 & -10 \\ 0 & 1 & 1 & -5 \\ 1 & -1 & -5 & 7 \end{array} \right]$$

$$\xrightarrow{R_1 \leftrightarrow R_3} \left[ \begin{array}{ccc|c} 1 & -1 & -5 & 7 \\ 0 & 1 & 1 & -5 \\ 5 & 4 & -16 & -10 \end{array} \right] \xrightarrow{-5R_1 + R_3} \left[ \begin{array}{ccc|c} 1 & -1 & -5 & 7 \\ 0 & 1 & 1 & -5 \\ 0 & 9 & 9 & -45 \end{array} \right]$$

$$\xrightarrow{\substack{-9R_2 + R_3 \\ R_2 + R_1}} \left[ \begin{array}{ccc|c} 1 & 0 & -4 & 2 \\ 0 & 1 & 1 & -5 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

$$\Rightarrow x_2 = -5 - x_3 \quad \& \quad x_1 = 2 + 4x_3$$

Take  $x_3 = t$ , then the solution is:

$$x_1 = 2 + 4t$$

$$x_2 = -5 - t$$

$$x_3 = t$$