

MA 303 HW #7

p. 79 #2b

$$\begin{array}{l}
 -2x \left\{ \begin{array}{l} x - 2y + 3z = 0 \\ 2x - 4y + 7z = 0 \end{array} \right. \\
 + \rightarrow \quad 0 + 0 + z = 0 \Rightarrow z = 0
 \end{array}
 \quad \left. \begin{array}{l} x - 2y = 0 \\ 2x - 4y = 0 \end{array} \right\} \Rightarrow y \text{ arbitrary} \\
 \text{and } x = 2y$$

Let $y = t$ then $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2t \\ t \\ 0 \end{bmatrix} = t \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$ for all t .

p. 83 #2b

$$\begin{bmatrix} 1 \\ 3 \\ 0 \end{bmatrix} = \alpha \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix} + \beta \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} \alpha + \beta \\ -\alpha + \beta \\ 0 \end{bmatrix} \Leftrightarrow \begin{cases} 1 = \alpha + \beta \\ 3 = -\alpha + \beta \end{cases}$$

$$\begin{array}{l}
 \rightarrow 4 = 2\beta \\
 \Rightarrow \beta = 2, \alpha = -1
 \end{array}$$

$$\Rightarrow x = \alpha u + \beta v = -u + 2v$$

p. 87 #2

$$\begin{array}{ccc}
 (a) & \begin{bmatrix} 1 & 1 \\ 2 & -1 \\ 2 & 1 \end{bmatrix} & \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix} \\
 & 3 \times 2 & 2 \times 1 \quad 3 \times 1
 \end{array}$$

$$(a) \quad \begin{bmatrix} 1 & 1 \\ 2 & -1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 0 \\ 3 \\ 1 \end{bmatrix} \neq \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix} \quad \text{not a solution}$$

$$(c) \quad \begin{bmatrix} 1 & 1 \\ 2 & -1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix} \quad \text{a solution}$$