

3.2.5d)

$$\left(\begin{array}{ccc|ccc} 0 & -2 & 4 & 1 & 0 & 0 \\ 1 & 1 & -1 & 0 & 1 & 0 \\ 2 & 4 & -5 & 0 & 0 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & -1 & 0 & 1 & 0 \\ 0 & -2 & 4 & 1 & 0 & 0 \\ 2 & 4 & -5 & 0 & 0 & 1 \end{array} \right) \rightarrow$$

$$\left(\begin{array}{ccc|ccc} 1 & 1 & -1 & 0 & 1 & 0 \\ 0 & -2 & 4 & 1 & 0 & 0 \\ 0 & 2 & 3 & 0 & -2 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & -1 & 0 & 1 & 0 \\ 0 & -2 & 4 & 1 & 0 & 0 \\ 0 & 2 & 3 & 0 & -2 & 1 \end{array} \right) \rightarrow$$

$$\left(\begin{array}{ccc|ccc} 1 & 1 & -1 & 0 & 1 & 0 \\ 0 & -2 & 4 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & -2 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & -1 & 0 & 1 & 0 \\ 0 & -2 & 4 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & -2 & 1 \end{array} \right) \rightarrow$$

$$\left(\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & -1 & 1 \\ 0 & 1 & 1 & 3/2 & -9 & 2 \\ 0 & 0 & 1 & 1 & -2 & 1 \end{array} \right)$$

$$A^{-1} = \begin{pmatrix} 1 & -1 & 1 \\ 3/2 & -9 & 2 \\ 1 & -2 & 1 \end{pmatrix}$$

3.1.1 a) T v) F c) T d) F e) T f) F g) T

h) F i) T

3.3.20)

$$x_1 + 2x_2 - x_3 = 0$$

$$2x_1 + x_2 + x_3 = 0$$

$$A = \begin{pmatrix} 1 & 2 & -1 \\ 2 & 1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 2 & -1 \\ 0 & -3 & 3 \end{pmatrix} \rightarrow$$

$$\begin{pmatrix} 1 & 2 & -1 \\ 0 & -1 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 0 & 1 \\ 0 & -1 & 1 \end{pmatrix}$$

$$x_2 = x_3, \quad x_1 = -x_3$$

$S_0 = \left\{ \begin{pmatrix} -t \\ t \\ t \end{pmatrix} \right\} \in \mathbb{R}$ is the solution space

$\begin{pmatrix} -1 \\ 1 \end{pmatrix}$ is a basis

3.9.5: The 3.16 gives us that A has rank

3.

Let B denote the reduced row echelon form of A . The

$$b_{31} = 2b_{11} + -5b_{21}$$

$$\Rightarrow a_3 = 2a_1 - 5a_2$$

$$= \begin{pmatrix} 2 \\ -2 \\ 6 \end{pmatrix} + \begin{pmatrix} 0 \\ 5 \\ -5 \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix}$$

$$b_{41} = -2b_{11} - 3b_{21} + 6b_{31}$$

$$\Rightarrow a_4 = -2a_1 - 3a_2 + 6a_3$$

$$= -2 \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix} - 3 \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix} + 6 \begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix}$$

$$= \begin{pmatrix} -2 \\ 2 \\ -6 \end{pmatrix} + \begin{pmatrix} 0 \\ 3 \\ -3 \end{pmatrix} + \begin{pmatrix} 6 \\ -6 \\ 0 \end{pmatrix}$$

$$= \begin{pmatrix} 4 \\ -1 \\ -9 \end{pmatrix}$$