MTH 329 Quiz 7

$$\text{Let } X = \left\{ \begin{bmatrix} 1 \\ 1 \\ 6 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 6 \\ 6 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 1 \\ 1 \end{bmatrix} \right\}$$

$$\begin{bmatrix} 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 6 & 1 & 0 & 1 \\ 2 & 1 & 1 & 1 \end{bmatrix} \begin{matrix} r_2^* = r_2 - r_1 \\ \\ r_3^* = r_3 - 6r_1 \\ \\ r_4^* = r_4 - 2r_1 \end{matrix} \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & -1 & 0 & 1 \\ 0 & -5 & 0 & 1 \\ 0 & -1 & 1 & 1 \end{bmatrix}$$

$$\begin{matrix} r_2^* = -r_2 \\ r_3^* = -r_3 \\ r_4^* = -r_4 \end{matrix} \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 5 & 0 & -1 \\ 0 & 1 & -1 & -1 \end{bmatrix} \qquad \begin{matrix} -1 - 5(-1) \\ \\ = -1 + 5 \end{matrix}$$

$$\begin{matrix} r_3^* = r_3 - 5r_2 \\ r_4^* = r_4 - r_2 \end{matrix} \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 0 & 4 \\ 0 & 0 & -1 & 0 \end{bmatrix}$$

$$r_3 \longleftrightarrow r_4 \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 4 \end{bmatrix}$$

$$\begin{matrix} r_3^* = -r_3 \\ r_4^* = \frac{1}{4} r_4 \end{matrix} \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$r_2^* = r_2 + r_4 \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$r_1^* = r_1 - r_2 \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$\Rightarrow$ the set X is independent