

## Quiz 6

$$1) \text{ Null}(T) = \left\{ \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \mid \begin{bmatrix} 2 & 3 & 0 \\ 1 & 0 & -1 \\ 1 & 1 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$$

Since  $\begin{bmatrix} 2 & 3 & 0 \\ 1 & 0 & -1 \\ 1 & 1 & 4 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ , we can conclude that

$x_1 = x_2 = x_3 = 0$  and  $\text{Null}(T) = \left\{ \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$ . So, a generating set

of  $\text{null}(T)$  is  $\left\{ \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$  and  $T$  is 1-1.

$$2) \det \begin{bmatrix} 4 & 2 & 2 & -3 \\ 6 & -1 & 1 & 5 \\ 0 & -3 & 0 & 0 \\ 2 & -5 & 0 & 0 \end{bmatrix} = -(-3) \det \begin{bmatrix} 4 & 2 & -3 \\ 6 & 1 & 5 \\ 2 & 0 & 0 \end{bmatrix}$$

$$= -(-3) \cdot 2 \det \begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix}$$

$$= 6(10 - (-3)) = 6(13) = 78.$$