

2-8

1

Ex: Find the inverse of  $\begin{bmatrix} 3 & 2 \\ 7 & 4 \end{bmatrix}$ .

$$\begin{bmatrix} 3 & 2 \\ 7 & 4 \end{bmatrix}^{-1} = \frac{1}{12-14} \begin{bmatrix} 4 & -2 \\ -7 & 3 \end{bmatrix}$$

$$= -\frac{1}{2} \begin{bmatrix} 4 & -2 \\ -7 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} -2 & 1 \\ \frac{7}{2} & -\frac{3}{2} \end{bmatrix}$$

2-2

2

Ex: Find the inverse of  $\begin{bmatrix} 3 & -4 \\ 7 & -8 \end{bmatrix}$ .

$$\begin{bmatrix} 3 & -4 \\ 7 & -8 \end{bmatrix}^{-1} = \frac{1}{-24 - (-28)} \begin{bmatrix} -8 & 4 \\ -7 & 3 \end{bmatrix}$$

$$= \frac{1}{4} \begin{bmatrix} -8 & 4 \\ -7 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} -2 & 1 \\ -\frac{7}{4} & \frac{3}{4} \end{bmatrix}$$

Q-Q

3

Ex: Find the inverse of  $A^{-1} \begin{bmatrix} 5 & 10 \\ 4 & 7 \end{bmatrix}$ .

$$\begin{bmatrix} 5 & 10 & 1 & 0 \\ 4 & 7 & 0 & 1 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & \frac{1}{5} & 0 \\ 4 & 7 & 0 & 1 \end{bmatrix} \sim$$

$$\begin{bmatrix} 1 & 2 & \frac{1}{5} & 0 \\ 0 & -1 & -\frac{4}{5} & 1 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & \frac{1}{5} & 0 \\ 0 & 1 & \frac{4}{5} & -1 \end{bmatrix} \sim$$

$$\begin{bmatrix} 1 & 0 & -\frac{7}{5} & 2 \\ 0 & 1 & \frac{4}{5} & -1 \end{bmatrix}$$

Therefore  $A^{-1} = \begin{bmatrix} -\frac{7}{5} & 2 \\ \frac{4}{5} & -1 \end{bmatrix}$ .

2-2

4

Ex: Find the inverse of  $A = \begin{bmatrix} 1 & -2 & 1 \\ 4 & -7 & 3 \\ -2 & 6 & -4 \end{bmatrix}$ .

$$\left[ \begin{array}{ccc|ccc} 1 & -2 & 1 & 1 & 0 & 0 \\ 4 & -7 & 3 & 0 & 1 & 0 \\ -2 & 6 & -4 & 0 & 0 & 1 \end{array} \right]$$

$$\sim \left[ \begin{array}{ccc|ccc} 1 & -2 & 1 & 1 & 0 & 0 \\ 0 & 1 & -1 & -4 & 1 & 0 \\ 0 & 0 & -2 & 2 & 0 & 1 \end{array} \right]$$

$$\sim \left[ \begin{array}{ccc|ccc} 1 & -2 & 1 & 1 & 0 & 0 \\ 0 & 1 & -1 & -4 & 1 & 0 \\ 0 & 0 & 0 & 10 & -2 & 1 \end{array} \right]$$

therefore  $A$  is not invertible.