(4) Find the inverse of $A = \begin{bmatrix} 1 & 3 & 0 & 0 & 0 \\ 2 & 5 & 0 & 0 & 0 \\ 0 & 0 & 1 & 2 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 3 \end{bmatrix}$

$$\left[\begin{array}{ccccc|ccccc} 1 & 3 & 0 & 0 & 0 & 1 & & & & 0 \\ 2 & 5 & 0 & 0 & 0 & & 1 & & & \\ 0 & 0 & 1 & 2 & 0 & & & 1 & & \\ 0 & 0 & 1 & 1 & 0 & & & & 1 & \\ 0 & 0 & 0 & 0 & 3 & 0 & & & & 1 \end{array}\right]$$

$$\sim \left[\begin{array}{ccccc|ccccc} 1 & 3 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & +1 & 0 & 0 & 0 & +2 & -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 2 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & +1 & 0 & 0 & 0 & +1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1/3 \end{array}\right]$$

$$\sim \left[\begin{array}{ccccc|ccccc} 1 & 0 & 0 & 0 & 0 & -5 & 3 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 2 & -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & -1 & 2 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1/3 \end{array}\right]$$

A^{-1}

$$A^{-1} = \begin{bmatrix} -5 & 3 & 0 & 0 & 0 \\ 2 & -1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 2 & 0 \\ 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 1/3 \end{bmatrix}$$