<u>Proposition 5</u>

Let e be a e-op
& Let A be a $m \times n$ matrix
& $e(I_m) = E$, ~~take~~ $\Rightarrow E$ is a $m \times m$ matrix

$\Rightarrow$ If e is scaling $R_k \to \alpha R_k$

$$\Rightarrow E = \begin{array}{c} \\ \\ \\ k^{th} \\ \\ \end{array} \begin{bmatrix} 1 & 0 & \cdots & \cdots & 0 \\ 0 & 1 & \cdots & \cdots & 0 \\ \vdots & & & & \\ 0 & 0 & \cdots & \alpha & 0 \\ 0 & 0 & \cdots & \cdots & 1 \end{bmatrix}$$

$$\Rightarrow e(A) = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ \vdots & & & \\ \alpha a_{k1} & \alpha a_{k2} & \cdots & \alpha a_{kn} \\ a_{m1} & \cdots & \cdots & a_{mn} \end{bmatrix}$$

Let $EA = \begin{array}{c c} & \begin{bmatrix} 1 & 0 & \cdots & 0 \\ 0 & 1 & \cdots & 0 \\ \vdots & & & \\ 0 & 0 & \cdots a \cdots & 0 \\ 0 & 0 & \cdots 0 & 1 \end{bmatrix} \end{array}$ with the fourth row labelled k^{th}, $\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ \vdots & & & \\ a_{m1} & \cdots & \cdots & a_{mn} \end{bmatrix}$

$$= \begin{array}{c c} & \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ \vdots & & & \\ a a_{k1} & a a_{k2} & \cdots & a a_{kn} \\ \vdots & & & \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix} \end{array} = e(A)$$

$\Rightarrow e(A) = EA$

Hence, Proved

Similarly, for replace and interchange