$$A = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$$

$$\underline{A' = A^T = {}^tA} = \begin{pmatrix} a_{11} & a_{21} \\ a_{12} & a_{22} \end{pmatrix}$$

$$B = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \end{bmatrix} \quad 2 \times 3$$

$$B^T = \begin{pmatrix} b_{11} & b_{21} \\ b_{12} & b_{22} \\ b_{13} & b_{23} \end{pmatrix} \quad 3 \times 2$$

$f: \mathbb{R}^n \to \mathbb{R}^m$

$x \qquad f(x) = b$

$Ax = b$

$$x = \begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{pmatrix}$$

$$A = \begin{matrix} m \\ \\ \end{matrix} \begin{bmatrix} a_1 & a_2 & \cdots & a_n \end{bmatrix}$$

$$b = \begin{pmatrix} b_1 \\ b_2 \\ \vdots \\ b_m \end{pmatrix}$$

$$b = \sum_{j=1}^{n} x_j a_j$$

$$= \sum_{i=1}^{m} b_i e_i$$

$$A = \begin{bmatrix} 2 & 6 & 8 \\ 0 & 3 & 3 \\ 1 & 5 & 6 \end{bmatrix} \rightsquigarrow \begin{matrix} 1 & 5 & 6 \\ 0 & 3 & 3 \\ 2 & 6 & 8 \end{matrix} \quad (-2)$$

$$\rightsquigarrow \begin{matrix} 1 & 5 & 6 \\ 0 & 3 & 3 \\ 0 & -4 & -4 \end{matrix} \rightsquigarrow \begin{matrix} 1 & 5 & 6 \\ 0 & 1 & 1 \\ 0 & -4 & -4 \end{matrix} \quad +4$$

$$\rightsquigarrow \begin{matrix} 1 & 5 & 6 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{matrix}$$

$r(A) = 2$