

## - Inverse Matrix

$A^{-1}$  : Inverse matrix of square matrix  $A$

$$A^{-1}A = AA^{-1} = I$$

\* the inverse matrix doesn't always exist. It could be existed or not

↳ If square matrix has an inverse matrix,

we call the matrix as 1) Invertible matrix 2) regular matrix.

If it doesn't, we call it as 1) non-invertible 2) singular matrix

## - Feature of Inverse matrix

$$① (A^T)^{-1} = (A^{-1})^T$$

$$② (AB)^{-1} = B^{-1}A^{-1}$$

$$③ (ABC)^{-1} = C^{-1}B^{-1}A^{-1}$$

## - Inverse matrix calculation

$$A^{-1} = \frac{1}{\det(A)} C^T = \frac{1}{\det(A)} \begin{bmatrix} C_{1,1} & \dots & C_{N,1} \\ \vdots & \ddots & \vdots \\ C_{1,N} & \dots & C_{N,N} \end{bmatrix}$$

$C$  = matrix of cofactors or Cofactor matrix or Comatrix

$C^T$  = adjoint matrix or adjugate matrix or adj(A)

↳ If  $\det(A) = 0$ , the inverse matrix doesn't exist