~~$(A \cdot B)^{-1} = B^{-1} \cdot A^{-1}$~~

$$(Q^T)^{-1} = Q$$

$$A = P \cdot D \cdot Q^T$$

$$(P)^{-1} = P^T$$

$$A^+ = Q \cdot ? \cdot P^T$$

Def.

$$\begin{bmatrix} \sigma_1 & & & & 0 \\ & \ddots & & & \\ & & \sigma_r & & \\ 0 & & & 0 & \\ & & & & \ddots \end{bmatrix}^+ = \begin{bmatrix} 1/\sigma_1 & & & & 0 \\ & 1/\sigma_2 & & & \\ & & \ddots & & \\ & & & 1/\sigma_r & \\ 0 & & & & 0 \ddots \end{bmatrix}$$

$$\begin{array}{cc} & 4 \\ 3 & \underbrace{\begin{bmatrix} 2 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}}_{A}^{+} \end{array} = \begin{array}{cc} & 3 \\ 4 & \underbrace{\begin{bmatrix} 1/4 & 0 & 0 \\ 0 & 1/4 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}}_{A^+} \end{array}$$

$$AA^+ = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$A^+A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$