

$$\textcircled{1} (AB)^* = B^* \cdot A^*$$

$$\begin{aligned} \because (AB)^* &= |AB| \cdot \underbrace{(AB)^{-1}} \\ &= |A| \cdot |B| \cdot B^{-1} \cdot A^{-1} \\ &= \underbrace{(|B| \cdot B^{-1})} \cdot \underbrace{(|A| \cdot A^{-1})} \\ &= B^* \cdot A^* \end{aligned}$$

$$AA^* = |A| \cdot E$$

$$\Rightarrow A^* = |A| \cdot A^{-1}$$

$$\textcircled{2} (A^*)^T = (A^T)^*$$

$$\begin{aligned} \because (A^*)^T &= (|A| \cdot A^{-1})^T = |A| \cdot \underbrace{(A^{-1})^T} \\ &= |A^T| \cdot \underbrace{(A^T)^{-1}} \\ &= (A^T)^* \end{aligned}$$