

$$f) \begin{pmatrix} 1 & 2 & 3 \\ 0 & -2 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ -1 \\ -1 \end{pmatrix} = \begin{pmatrix} -6 \\ 1 \end{pmatrix}$$

a) undefiniert

$$b) \begin{pmatrix} 4 & 2 & 5 \\ 1 & -1 & 5 \end{pmatrix}$$

c) undefiniert

$$d) \begin{pmatrix} -11 & 2 & -5 \\ -4 & -6 & -15 \end{pmatrix}$$

e) undefiniert

g) undefiniert

$$h) \begin{pmatrix} 7 & 4 & 18 \\ 9 & 3 & 16 \end{pmatrix}$$

$$i) \begin{pmatrix} 14 & -1 \\ -1 & 5 \end{pmatrix}$$

$$j) \begin{pmatrix} 7 & 9 \\ 4 & 3 \\ 18 & 16 \end{pmatrix}$$

$$a) (A \cdot B)^T = \underline{B^T} \cdot A^T \quad A, B \in K^{n \times n}$$

$$C = A \cdot B, \quad D = \underline{B^T} \cdot A^T$$

$$c_{ij} = \sum_{k=1}^n a_{ik} \cdot b_{kj}$$

$$d_{ij} = \sum_{k=1}^n b_{ki} \cdot a_{jk} = \underline{\sum_{k=1}^n a_{jk} \cdot b_{ki}}$$

$$C^T = D$$

$$c_{ji} = \sum_{k=1}^n a_{jk} \cdot b_{ki}$$

$$c_{ji} = d_{ij} \Rightarrow C^T = D$$

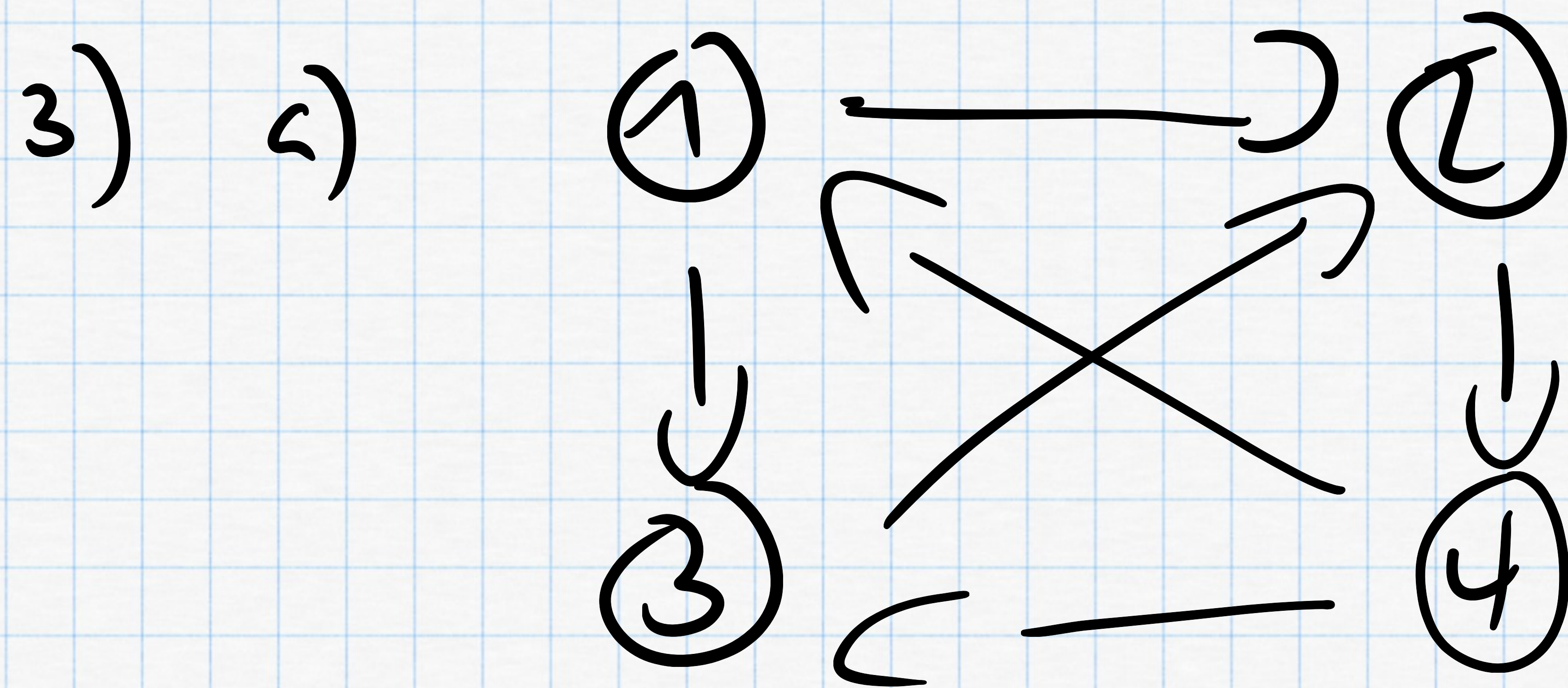
$$\Rightarrow (A \cdot B)^T = B^T \cdot A^T$$

$$b) (A + B)^2 \stackrel{?}{=} A^2 + 2AB + B^2$$

$$(A + B)^2 = A^2 + AB + BA + B^2 \stackrel{?}{=} A^2 + 2AB + B^2$$

$$AB + BA = 2AB$$

$$BA = AB$$



b)

$$\underline{A^2} = A \cdot A = \begin{pmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 2 & 1 & 0 \end{pmatrix}$$

$$\underline{A^3} = A^2 \cdot A = A \cdot A^2 = \begin{pmatrix} 1 & 0 & 1 & 1 \\ 0 & 2 & 1 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 2 \end{pmatrix}$$

$$|A| = \begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 \end{pmatrix}$$

c) 3