

A6

A6: Ermittle mit dem Gauß-Jordan-Algorithmus die Inverse der Matrix A.

a. $A = \begin{bmatrix} 1 & 3 & 1 \\ 0 & 1 & 2 \\ 1 & 3 & 2 \end{bmatrix}$ b. $A = \begin{bmatrix} 3 & 2 & 2 \\ -3 & -4 & -3 \\ -4 & -3 & -3 \end{bmatrix}$

$$\left[\begin{array}{ccc|ccc} 1 & 3 & 1 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 1 & 3 & 2 & 0 & 0 & 1 \end{array} \right] \quad (-1, 0, 1)$$

$$\left[\begin{array}{ccc|ccc} 1 & 3 & 1 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right] \quad (0, 1, -2)$$

$$\left[\begin{array}{ccc|ccc} 1 & 3 & 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 2 & 1 & -2 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right] \quad (1, 0, -1)$$

$$\left[\begin{array}{ccc|ccc} 1 & 3 & 0 & 2 & 0 & -1 \\ 0 & 1 & 0 & 2 & 1 & -2 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right] \quad (1, -3, 0)$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -4 & -3 & 5 \\ 0 & 1 & 0 & 2 & 1 & -2 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right]$$

$$A^{-1} = \begin{bmatrix} -4 & -3 & 5 \\ 2 & 1 & -2 \\ -1 & 0 & 1 \end{bmatrix}$$

b.

$$\left[\begin{array}{ccc|ccc} 3 & 2 & 2 & 1 & 0 & 0 \\ -3 & -4 & -3 & 0 & 1 & 0 \\ -4 & -3 & -3 & 0 & 0 & 1 \end{array} \right] \quad (1, 1, 0)$$

$$\left[\begin{array}{ccc|ccc} 3 & 2 & 2 & 1 & 0 & 0 \\ 0 & -2 & -1 & 1 & 1 & 0 \\ -4 & -3 & -3 & 0 & 0 & 1 \end{array} \right] \quad (4, 0, 3)$$

$$\left[\begin{array}{ccc|ccc} 3 & 2 & 2 & 1 & 0 & 0 \\ 0 & -2 & -1 & 1 & 1 & 0 \\ 0 & -1 & -1 & 4 & 0 & 3 \end{array} \right] \quad (0, -1, 2)$$

$$\left[\begin{array}{ccc|ccc} 3 & 2 & 2 & 1 & 0 & 0 \\ 0 & -2 & -1 & 1 & 1 & 0 \\ 0 & 0 & -1 & 7 & -1 & 6 \end{array} \right] \quad (0, 1, -1)$$

$$\left[\begin{array}{ccc|ccc} 3 & 2 & 2 & 1 & 0 & 0 \\ 0 & -2 & 0 & -6 & 2 & -6 \\ 0 & 0 & -1 & 7 & -1 & 6 \end{array} \right] \quad (1, 0, 2)$$

$$\left[\begin{array}{ccc|ccc} 3 & 2 & 0 & 15 & -2 & 12 \\ 0 & -2 & 0 & -6 & 2 & -6 \\ 0 & 0 & -1 & 7 & -1 & 6 \end{array} \right] \quad (1, 1, 0)$$

$$\left[\begin{array}{ccc|ccc} 3 & 0 & 0 & 9 & 0 & 6 \\ 0 & -2 & 0 & -6 & 2 & -6 \\ 0 & 0 & -1 & 7 & -1 & 6 \end{array} \right] \quad \begin{array}{l} \cdot 1/3 \\ \cdot -1/2 \\ \cdot -1 \end{array}$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 3 & 0 & 2 \\ 0 & 1 & 0 & 3 & -1 & 3 \\ 0 & 0 & 1 & -7 & 1 & -6 \end{array} \right]$$

$$A^{-1} = \begin{bmatrix} 3 & 0 & 2 \\ 3 & -1 & 3 \\ -7 & 1 & -6 \end{bmatrix}$$