

Opg 4

Beregn determinant og løsninger

$$1. \left[\begin{array}{cccc|c} 1 & -3 & 3 & -3 & -24 \\ -1 & 2 & -1 & 1 & 7 \\ 1 & -3 & 2 & -2 & -12 \\ 2 & -1 & 2 & -1 & -4 \end{array} \right]$$

Annotations: $\leftarrow +1$ (pointing to row 1), $\leftarrow +2$ (pointing to row 3), $\leftarrow +2$ (pointing to row 4)

$$\left[\begin{array}{cccc|c} 0 & -1 & 2 & -2 & -7 \\ -1 & 2 & -1 & 1 & 7 \\ 0 & -1 & 1 & -1 & -5 \\ 0 & 3 & 0 & 1 & 10 \end{array} \right]$$

Annotations: $\leftarrow +1 \cdot -1$ (pointing to row 2), $\leftarrow -1$ (pointing to row 3)

$$\left[\begin{array}{cccc|c} 0 & -1 & 2 & -2 & -7 \\ 1 & -1 & 0 & 0 & -2 \\ 0 & 1 & -1 & 1 & 5 \\ 0 & 3 & 0 & 1 & 10 \end{array} \right]$$

Annotations: $\leftarrow +2$ (pointing to row 4)

$$\left[\begin{array}{cccc|c} 0 & 1 & 0 & 0 & 3 \end{array} \right]$$

$$\left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & -2 \\ 0 & 1 & -1 & 1 & 5 \\ 0 & 3 & 0 & 1 & 10 \end{array} \right] \begin{array}{l} \leftarrow +1 \\ -1 \leftarrow \\ \leftarrow +1 \end{array}$$

$$\left[\begin{array}{cccc|c} 0 & 1 & 0 & 0 & 3 \\ 1 & 0 & 0 & 0 & 1 \\ 0 & 2 & 1 & 0 & 5 \\ 0 & 3 & 0 & 1 & 10 \end{array} \right] \begin{array}{l} \leftarrow -2 \\ \leftarrow -3 \end{array}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 3 \\ 0 & 0 & 1 & 0 & -1 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right]$$

$$\left[\begin{array}{cccc|c} 1 & -3 & 3 & -3 & -14 \\ -2 & 2 & -1 & 1 & 7 \\ 1 & -3 & 2 & -2 & -12 \\ 2 & -1 & 2 & -1 & -4 \end{array} \right]$$

$$= +1 \left[\begin{array}{ccc} 2 & -1 & 1 \\ -3 & 2 & -2 \\ -1 & 2 & -1 \end{array} \right] - (-3) \left[\begin{array}{ccc} -1 & -1 & 1 \\ 1 & 2 & -2 \\ 2 & 2 & -1 \end{array} \right]$$

$$+ 3 \left[\begin{array}{ccc} 1 & 2 & 1 \\ 1 & -3 & -2 \\ 2 & 2 & -1 \end{array} \right] - (-3) \left[\begin{array}{ccc} 1 & 2 & -1 \\ 1 & -3 & 2 \\ 2 & -1 & 2 \end{array} \right]$$

$$= +2 \left[\begin{array}{cc} 2 & -2 \\ 2 & -1 \end{array} \right] - (-1) \left[\begin{array}{cc} -3 & -2 \\ -2 & -1 \end{array} \right]$$

$$+ 1 \left[\begin{array}{cc} -3 & 2 \\ -1 & 2 \end{array} \right] = 4 - 1 + (-4) = \boxed{-1}$$

$$= -1 \begin{bmatrix} 2 & -2 \\ 2 & -1 \end{bmatrix} - (-1) \begin{bmatrix} 1 & -2 \\ 2 & -1 \end{bmatrix}$$

$$+ 1 \begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix} = -2 + 3 - 2 = \boxed{-1}$$

$$= +1 \begin{bmatrix} -3 & -2 \\ 2 & -1 \end{bmatrix} - 2 \begin{bmatrix} 1 & -2 \\ 2 & -1 \end{bmatrix}$$

$$+ 1 \begin{bmatrix} 1 & -3 \\ 2 & 2 \end{bmatrix} = 7 - 6 + 8 = \boxed{9}$$

$$= 1 \begin{bmatrix} -3 & 2 \\ -1 & 2 \end{bmatrix} - 2 \begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$$

$$+ (-1) \begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix} = -4 + 4 - 5 = \boxed{-5}$$

$$1[-1] - (-3)[-1] + 3[9] - (-3)[-5]$$
$$= -1 - 3 + 27 - 15 = \underline{\underline{8}} = 1$$

opg 2 Beregn determinanten
for følgende matricer og
bestem den inverse såfremt
den eksisterer.

$$A = \begin{bmatrix} 3 & 3 \\ 2 & 0 \end{bmatrix} \quad B = \begin{bmatrix} -1 & -2 \\ 3 & 3 \end{bmatrix}$$

$$C = \begin{bmatrix} 0 & 1 & 0 \\ -1 & 2 & -1 \\ -3 & 1 & -5 \end{bmatrix} \quad D = \begin{bmatrix} 4 & -4 & 0 \\ 2 & -4 & 5 \\ 2 & 0 & 5 \end{bmatrix}$$

$$A^{-1} = \frac{1}{|A|} \cdot \text{adj}(A)$$