Aufgabe 3

1) $M = \begin{pmatrix} m_{11} & m_{21} \\ m_{21} & m_{22} \end{pmatrix}$

$N = \begin{pmatrix} N_{11} & N_{21} \\ N_{21} & N_{22} \end{pmatrix}$ $\quad O = M \cdot N$

Multiplikation

$O_{11} = m_{11} N_{11} + m_{12} N_{21}$ ✓ stimmt

$O_{12} = m_{11} N_{12} + m_{12} N_{22}$

$O_{21} = m_{21} N_{11} + m_{22} N_{21}$

$O_{22} = m_{21} N_{12} + m_{22} N_{22}$

2) z.B $O_{11} = H_1 + H_4 - H_5 + H_7$

$= (m_{11} + m_{22})(N_{11} + N_{22}) + m_{22}(N_{21} - N_{11})$

$- N_{22}(m_{11} + m_{12}) + (m_{12} - m_{22})(N_{21} + N_{22})$

$= m_{11} N_{11} + m_{12} N_{21}$ ✓ stimmt

Laufzeit O:

1) $\rightarrow T(n) = 8T\left(\frac{n}{2}\right) + \Theta(n^2) = O(n^3)$

2) $\rightarrow T(n) = 7T\left(\frac{n}{2}\right) + \Theta(n^2) = \Theta(n^{\log_2 7}) = \Theta n^{2,7}$