

S 220 Nr. 3c)

$$f(x) = ax^2 + bx + c; \quad A(-4|0); \quad B(0|-4)$$

$$A: f(-4) = a \cdot (-4)^2 + b \cdot (-4) + c = 0$$

$$B: f(0) = a \cdot 0^2 + b \cdot 0 + c = \underline{\underline{-4}}$$

$$16a - 4b + c = 0$$

$$16a = 4 + 4b$$

$$a = \frac{4}{16} + \frac{4}{16}b = \frac{1}{4} + \frac{1}{4}b$$

$$\text{für } b = t; \quad a = \frac{1}{4} + \frac{1}{4}t$$

$$\underline{\underline{f(x) = \left(\frac{1}{4} + \frac{1}{4}t\right)x^2 + t \cdot x - 4 = \frac{1}{4}(1+t)x^2 + tx - 4; \quad t \in \mathbb{R}}}$$

S 220 Nr. 4 $f(x) = ax^3 + bx^2 + cx + d$

a) $A(0|1); B(1|0); C(-1|4); D(2|-5)$

$$A: f(0) = a \cdot 0 + b \cdot 0 + c \cdot 0 + d = 1$$

$$B: f(1) = a \cdot 1^3 + b \cdot 1^2 + c \cdot 1 + d = 0$$

$$C: f(-1) = a \cdot (-1)^3 + b \cdot (-1)^2 + c \cdot (-1) + d = 4$$

$$D: f(2) = a \cdot 2^3 + b \cdot 2^2 + c \cdot 2 + d = -5$$

$$\Rightarrow \left(\begin{array}{cccc|c} 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 \\ -1 & 1 & -1 & 1 & 4 \\ 8 & 4 & 2 & 1 & -5 \end{array} \right)$$

$$\text{mit GTR} \Rightarrow \left(\begin{array}{cccc|c} 1 & 0 & 0 & 0 & -1 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & -1 \\ 0 & 0 & 0 & 1 & 1 \end{array} \right) \Rightarrow \underline{\underline{f(x) = -x^3 + x^2 - x + 1}}$$

b) $A(0|-1); B(1|1); C(-1|7); D(2|17)$

$$A: f(0) = a \cdot 0^3 + b \cdot 0^2 + c \cdot 0 + d = -1$$

$$B: f(1) = a \cdot 1^3 + b \cdot 1^2 + c \cdot 1 + d = 1$$

$$C: f(-1) = a \cdot (-1)^3 + b \cdot (-1)^2 + c \cdot (-1) + d = 7$$

$$D: f(2) = a \cdot 2^3 + b \cdot 2^2 + c \cdot 2 + d = 17$$

$$\Rightarrow \left(\begin{array}{cccc|c} 0 & 0 & 0 & 1 & -1 \\ 1 & 1 & 1 & 1 & 1 \\ -1 & 1 & -1 & 1 & 7 \\ 8 & 4 & 2 & 1 & 17 \end{array} \right)$$

$$\text{mit GTR} \Rightarrow \left(\begin{array}{cccc|c} 1 & 0 & 0 & 0 & \frac{2}{3} \\ 0 & 1 & 0 & 0 & 5 \\ 0 & 0 & 1 & 0 & -\frac{11}{3} \\ 0 & 0 & 0 & 1 & -1 \end{array} \right) \Rightarrow \underline{\underline{f(x) = \frac{2}{3}x^3 + 5x^2 - \frac{11}{3}x - 1}}$$