

S 220 Nr. 1

a)  $f(x) = ax^2 + bx + c$  ;  $A(-1|0)$  ;  $B(0|-1)$  ;  $C(1|0)$

aus A  $\Rightarrow f(-1) = a \cdot (-1)^2 + b \cdot (-1) + c = 0$

aus B  $\Rightarrow f(0) = a \cdot 0^2 + b \cdot (0) + c = -1 \Rightarrow c = -1$

aus C  $\Rightarrow f(1) = a \cdot 1^2 + b \cdot 1 + c = 0$

$$\begin{array}{ccc|c} a & -b & +c & = 0 \end{array} \cdot 1$$

$$\begin{array}{ccc|c} a & +b & +c & = 0 \end{array} \cdot 1$$

$$\begin{array}{ccc|c} a & -b & +c & = 0 \end{array}$$

$$c = -1$$

$$2a \quad + 2c = 0$$

$$c = -1$$

$$2a \quad + 2 \cdot (-1) = 0 \Rightarrow \underline{a = 1}$$

$$1 \quad -b \quad -1 = 0 \Rightarrow \underline{b = 0}$$

$$\Rightarrow \underline{f(x) = 1 \cdot x^2 + 0 \cdot x - 1 = x^2 - 1}$$

b)  $f(x) = ax^2 + bx + c$  ;  $A(0|0)$  ;  $B(1|0)$  ;  $C(2|3)$

A:  $f(0) = c = 0$  bereits in die nächsten Gleichungen einsetzen

B:  $f(1) = a \cdot 1 + b \cdot 1 + 0 = 0 \Rightarrow \begin{array}{l} a + b = 0 \\ 4a + 2b = 3 \end{array} \cdot (-1)$

C:  $f(2) = a \cdot 2^2 + b \cdot 2 + 0 = 3 \Rightarrow \begin{array}{l} a + b = 0 \\ -2a = -3 \end{array}$

$$a = \frac{3}{2}$$

$$\frac{3}{2} + b = 0 \Rightarrow \underline{b = -\frac{3}{2}}$$

$$\underline{f(x) = \frac{3}{2}x^2 - \frac{3}{2}x}$$

e)  $f(x) = ax^2 + bx + c$  ;  $A(1|3)$  ;  $B(-1|2)$  ;  $C(3|2)$

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

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

C:  $f(3) = a \cdot 3^2 + b \cdot (3) + c = 2 \Rightarrow \begin{pmatrix} 1 & 1 & 1 & | & 3 \\ 1 & -1 & 1 & | & 2 \\ 9 & 3 & 1 & | & 2 \end{pmatrix}$

mit GTR  $\begin{pmatrix} 1 & 0 & 0 & | & -\frac{1}{4} \\ 0 & 1 & 0 & | & \frac{1}{2} \\ 0 & 0 & 1 & | & \frac{11}{4} \end{pmatrix} \Rightarrow a = -\frac{1}{4} ; b = \frac{1}{2} ; c = \frac{11}{4}$

$$\underline{f(x) = -\frac{1}{4}x^2 + \frac{1}{2}x + \frac{11}{4}}$$