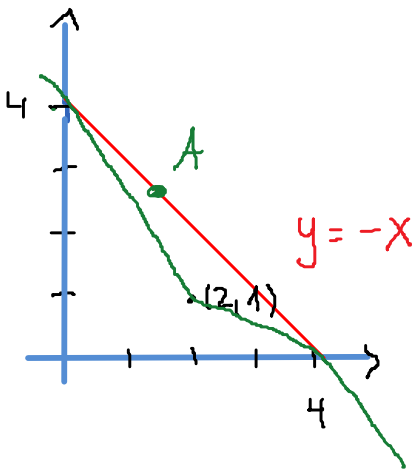
Aufgabe 4



Umgehungsstraße

$y = ax^4 + bx^3 + cx^2 + dx + e$

$y' = 4ax^3 + 36x^2 + 2cx + d$

PP(0,4) : $\boxed{4 = e}$

PP(4,0) : $0 = 256a + 64b + 16c + 4d + 4$

$y'(0) = -1$ $\boxed{-1 = d}$

$y'(4) = -1 \quad -1 = 256a + 48b + 8c - 1$

$\Leftrightarrow \quad 256a + 48b + 8c = 0$

PP(2,1) : $1 = 16a + 8b + 4c - 2 + 4$

$\Leftrightarrow \quad -1 = 16a + 8b + 4c$

$$\left(\begin{array}{ccc|c} 256 & 64 & 16 & 0 \\ 256 & 48 & 8 & 0 \\ 16 & 8 & 4 & -1 \end{array}\right) \begin{array}{l} \text{I} \\ \text{II} \quad -\text{I} \\ \text{III} \quad -\frac{1}{16} \times \text{I} \end{array}$$

$$\left(\begin{array}{ccc|c} 256 & 64 & 16 & 0 \\ 0 & -16 & -8 & 0 \\ 0 & 4 & 2 & -1 \end{array}\right) \begin{array}{l} \\ \text{II}^* \\ \cdot 1 \cdot \text{II}^* \end{array}$$

$$\left(\begin{array}{ccc|c} 0 & -16 & -8 & 0 \\ 0 & 4 & 3 & -1 \end{array}\right) \quad \begin{matrix} \text{II} \\ +\frac{1}{4} \times \text{II}^* \end{matrix}$$

$$\left(\begin{array}{ccc|c} 256 & 64 & 16 & 0 \\ 0 & -16 & -8 & 0 \\ 0 & 0 & 1 & -1 \end{array}\right)$$

$e = 4$

$d = -1$

$c = -1$

$b = \frac{1}{2}$

$a = -\frac{1}{16}$

$-16b + 8 = 0$

$b = \frac{1}{2}$

$256a + 32 - 16 = 0$

$a = -\frac{1}{16}$

Lösungsschar:

$$y = -\frac{1}{16}x^4 + \frac{1}{2}x^3 - x^2 - x + 4$$