

LÖSUNG ZU 36f:

$$f(x) = x^4 - 10x^3 + 36x^2 - 54x + 27$$

konstantes Glied: 27

$$T_9 = \{\pm 1, \pm 3, \pm 9, \pm 27\}$$

$$\begin{aligned} \text{z.B.: } x = 1 \quad 1 - 10 + 36 - 54 + 27 &= 0 \\ 0 &= 0 \quad \text{f. A.} \end{aligned}$$

$$\begin{array}{r} (x^4 - 10x^3 + 36x^2 - 54x + 27) : (x - 1) = x^3 - 9x^2 + 27x - 27 \\ \underline{-x^4 + x^3} \\ -9x^3 + 36x^2 \\ \underline{9x^3 - 9x^2} \\ 27x^2 - 54x \\ \underline{-27x^2 + 27x} \\ -27x + 27 \\ \underline{27x - 27} \\ 0 \end{array}$$

$$x^3 - 9x^2 + 27x - 27 = 0$$

konstantes Glied:- 27

$$T_9 = \{\pm 1, \pm 3, \pm 9, \pm 27\}$$

$$\begin{aligned} \text{z.B.: } x = 1 \quad 1 - 9 + 27 - 27 &= 0 \\ -8 &= 0 \quad \text{f. A.} \end{aligned}$$

$$\begin{aligned} x = -1 \quad -1 - 9 - 27 - 27 &= 0 \\ -64 &= 0 \quad \text{w.A.} \end{aligned}$$

$$\begin{aligned} x = 3 \quad 27 - 54 + 54 - 27 &= 0 \\ 0 &= 0 \quad \text{w.A.} \end{aligned}$$

$$(x^3 - 9x^2 + 27x - 27) : (x - 3) = x^2 - 6x + 9$$

$$\begin{array}{r} \underline{-x^3 + 3x^2} \\ -6x^2 + 27x \\ \underline{6x^2 - 18x} \\ +9x - 27 \\ \underline{-9x + 27} \\ 0 \end{array}$$

$$x^2 - 6x + 9 = 0$$

$$x_{3,4} = 3 \pm \sqrt{9 - 9}$$

$$x_{3,4} = 3 \quad L = \{1; 3 \text{ (Dreifachnullstelle)}\}$$

