

Aufgabe 1: Berechne $(4x^5 - 11x^3 - x^2 + 5x) : (2x^2 - x - 3)$

$$\begin{array}{r} (4x^5 - 11x^3 - x^2 + 5x) : (2x^2 - x - 3) = 2x^3 + x^2 - 2x \text{ Rest } -x \\ -(4x^5 - 2x^4 - 6x^3) \end{array}$$

$$\begin{array}{r} 2x^4 - 5x^3 - x^2 + 5x \\ -(2x^4 - x^3 - 3x^2) \end{array}$$

$$\begin{array}{r} -4x^3 + 2x^2 + 5x \\ -(-4x^3 + 2x^2 + 6x) \end{array}$$

$$-x$$

Aufgabe 2: Bestimme die Nullstellen der Funktion $f(x) = 2x^4 + 12x^3 - 14x^2 - 96x - 72$

$x_1 = -1$ durch Probieren

$$\begin{array}{r} (2x^4 + 12x^3 - 14x^2 - 96x - 72) : (x + 1) = 2x^3 + 10x^2 - 24x - 72 \\ 2x^4 + 2x^3 \end{array}$$

$$\begin{array}{r} 10x^3 - 14x^2 - 96x - 72 \\ 10x^3 + 10x^2 \end{array}$$

$$\begin{array}{r} -24x^2 - 96x - 72 \\ -24x^2 - 24x \end{array}$$

$$\begin{array}{r} -72x - 72 \\ -72x - 72 \end{array}$$

$$0$$

$x_2 = -2$ durch Probieren

$$\begin{array}{r} (2x^3 + 10x^2 - 24x - 72) : (x + 2) = 2x^2 + 6x - 36 \\ 2x^3 + 4x^2 \end{array}$$

$$\begin{array}{r} 6x^2 - 24x - 72 \\ 6x^2 + 12x \end{array}$$

$$\begin{array}{r} -36x - 72 \\ -36x - 72 \end{array}$$

$$0$$

$$2x_n^2 + 6x_n - 36 = 0 \quad | :2$$

$$x_n^2 + 3x_n - 18 = 0 \quad \text{p-q-Formel: } x_{3/4} = -1,5 \pm \sqrt{1,5^2 + 18} = -1,5 \pm 4,5 \quad \Rightarrow x_3 = -6; x_4 = 3$$

Also $x_1 = -1; x_2 = -2; x_3 = -6; x_4 = 3$