

Aufgabe 1: Berechne $(2x^5 + x^4 + 7x^3 - 8x^2 - 2x - 5) : (x^3 + 3x - 5)$

$$\begin{array}{r}
 (2x^5 + x^4 + 7x^3 - 8x^2 - 2x - 5) : (x^3 + 3x - 5) = 2x^2 + x + 1 \quad \text{Rest } -x^2 \\
 -(2x^5 \quad + 6x^3 - 10x^2) \\
 \hline
 x^4 + x^3 + 2x^2 - 2x - 5 \\
 -(x^4 \quad + 3x^2 - 5x) \\
 \hline
 x^3 - x^2 + 3x - 5 \\
 -(x^3 \quad + 3x - 5) \\
 \hline
 -x^2
 \end{array}$$

Aufgabe 2: Bestimme die Nullstellen der Funktion $f(x) = 2x^4 + 8x^3 - 30x^2 - 116x - 80$

$x_1 = -1$ durch Probieren

$$\begin{array}{r}
 (2x^4 + 8x^3 - 30x^2 - 116x - 80) : (x + 1) = 2x^3 + 6x^2 - 36x - 80 \\
 2x^4 + 2x^3 \\
 \hline
 6x^3 - 30x^2 - 116x - 80 \\
 6x^3 + 6x^2 \\
 \hline
 -36x^2 - 116x - 80 \\
 -36x^2 - 36x \\
 \hline
 -80x - 80 \\
 -80x - 80 \\
 \hline
 0
 \end{array}$$

$x_2 = -2$ durch Probieren

$$\begin{array}{r}
 (2x^3 + 6x^2 - 36x - 80) : (x + 2) = 2x^2 + 2x - 40 \\
 2x^3 + 4x^2 \\
 \hline
 2x^2 - 36x - 80 \\
 2x^2 + 4x \\
 \hline
 -40x - 80 \\
 -40x - 80 \\
 \hline
 0
 \end{array}$$

$$2x_n^2 + 2x_n - 40 = 0 \quad | :2$$

$$x_n^2 + x_n - 20 = 0 \quad \text{p-q-Formel: } x_{3/4} = -0,5 \pm \sqrt{0,5^2 + 20} = -0,5 \pm 4,5 \quad \Rightarrow x_3 = -5; x_4 = 4$$

Also $x_1 = -1; x_2 = -2; x_3 = -5; x_4 = 4$