

Aufgabe 1: Berechne:

- a) $(4x^3 - 3x^2 + 7x + 2) : (4x + 1)$
 b) $(4x^4 + 10x^3 + 4x^2 + 2x) : (4x^3 + 2x^2 + x)$
 c) $(-4x^7 + 2x^6 - 5x^5 - 8x^4 + 5x^3 - 10x^2 + 2) : (-4x^4 + 2x^3 - 5x^2 + 1)$
 d) $(2x^8 + 4x^6 + 5x^5 + 2x^4 + 5x^3 + 3x^2) : (2x^4 + 2x^2 + 3x)$
 e) $(-8x^5 - 2x^3 + 4x^2 + 6x + 4) : (-4x^3 + 3x + 2)$
 f) $(6x^6 + 2x^5 + 3x^3 - 2x^2 - x) : (3x^2 + x)$
 g) $(4x^5 + 4x^4 + x^2 - 1) : (4x^4 + x - 1)$
 h) $(6x^2 + 5x + 1) : (3x + 1)$
 i) $(2x^4 + 3x^3 + x^2) : (2x^3 + x^2)$
 j) $(-3x^4 - 2x^3 + 2x^2 + x) : (-3x^3 + x^2 + x)$
 k) $(-3x^6 + 2x^5 + 11x^4 + 4x^3) : (3x^2 + 4x)$
 l) $(8x^2 + 12x + 4) : (4x + 4)$
 m) $(2x^4 + 2x^3 + 4x^2 + 2x + 2) : (2x^2 + 2)$
 n) $(6x^6 + 6x^5 - 5x^4 + 7x^3 - 6x^2 + 2x) : (3x^3 + 2x)$
 o) $(-6x^6 - x^5 - 8x^4 + 7x^3 + 2x^2 + 6x) : (2x^2 + x + 3)$

Lösungen

- a) $x^2 - x + 2$
 b) $x + 2$ Rest $-x^2$
 c) $x^3 + 2$
 d) $x^4 + x^2 + x$
 e) $2x^2 + 2$
 f) $2x^4 + x - 1$
 g) $x + 1$
 h) $2x + 1$
 i) $x + 1$
 j) $x + 1$
 k) $-x^4 + 2x^3 + x^2$
 l) $2x + 1$
 m) $x^2 + x + 1$
 n) $2x^3 + 2x^2 - 3x + 1$
 o) $-3x^4 + x^3 + 2x$

Rechnungen:

$$(4x^3 - 3x^2 + 7x + 2) : (4x + 1) = x^2 - x + 2$$

$$\begin{array}{r} 4x^3 + x^2 \\ \hline - 4x^2 + 7x + 2 \\ - 4x^2 - x \\ \hline 8x + 2 \\ 8x + 2 \\ \hline 0 \end{array}$$

$$(4x^3 + 10x^2 + 4x + 2) : (4x^2 + 2x + 1) = x + 2 \quad \text{Rest } -x$$

$$\begin{array}{r} 4x^3 + 2x^2 + x \\ \hline 8x^2 + 3x + 2 \\ 8x^2 + 4x + 2 \\ \hline -x \end{array}$$

$$(4x^7 - 2x^6 + 5x^5 + 8x^4 - 5x^3 + 10x^2 - 2) : (4x^4 - 2x^3 + 5x^2 - 1) = x^3 + 2$$

$$\begin{array}{r} 4x^7 - 2x^6 + 5x^5 \\ \hline 8x^4 - 4x^3 + 10x^2 - 2 \\ 8x^4 - 4x^3 + 10x^2 - 2 \\ \hline 0 \end{array}$$

$$(2x^7 + 4x^5 + 5x^4 + 2x^3 + 5x^2 + 3x) : (2x^3 + 2x + 3) = x^4 + x^2 + x$$

$$\begin{array}{r} 2x^7 + 2x^5 + 3x^4 \\ \hline 2x^5 + 2x^4 + 2x^3 + 5x^2 + 3x \\ 2x^5 + 2x^3 + 3x^2 \\ \hline 2x^4 + 2x^2 + 3x \\ 2x^4 + 2x^2 + 3x \\ \hline 0 \end{array}$$

$$(8x^5 + 2x^3 - 4x^2 - 6x - 4) : (4x^3 - 3x - 2) = 2x^2 + 2$$

$$\begin{array}{r} 8x^5 - 6x^3 - 4x^2 \\ \hline 8x^3 - 6x - 4 \\ 8x^3 - 6x - 4 \\ \hline 0 \end{array}$$

$$(6x^5 + 2x^4 + 3x^2 - 2x - 1) : (3x + 1) = 2x^4 + x - 1$$

$$6x^5 + 2x^4$$

$$\begin{array}{r}
 3x^2 - 2x - 1 \\
 3x^2 + x \\
 \hline
 -3x - 1 \\
 -3x - 1 \\
 \hline
 0
 \end{array}$$

$$(4x^5 + 4x^4 + x^2 - 1) : (4x^4 + x - 1) = x + 1$$

$$\begin{array}{r}
 4x^5 + 4x^4 + x^2 - 1 \\
 4x^5 + x - 1 \\
 \hline
 0
 \end{array}$$

$$(6x^2 + 5x + 1) : (3x + 1) = 2x + 1$$

$$\begin{array}{r}
 6x^2 + 5x + 1 \\
 6x^2 + 2x \\
 \hline
 3x + 1 \\
 3x + 1 \\
 \hline
 0
 \end{array}$$

$$(2x^2 + 3x + 1) : (2x + 1) = x + 1$$

$$\begin{array}{r}
 2x^2 + 3x + 1 \\
 2x^2 + x \\
 \hline
 2x + 1 \\
 2x + 1 \\
 \hline
 0
 \end{array}$$

$$(3x^3 + 2x^2 - 2x - 1) : (3x^2 - x - 1) = x + 1$$

$$\begin{array}{r}
 3x^3 + 2x^2 - 2x - 1 \\
 3x^3 - x^2 - x \\
 \hline
 3x^2 - x - 1 \\
 3x^2 - x - 1 \\
 \hline
 0
 \end{array}$$

$$(-3x^5 + 2x^4 + 11x^3 + 4x^2) : (3x + 4) = -x^4 + 2x^3 + x^2$$

$$\begin{array}{r}
 -3x^5 + 2x^4 + 11x^3 + 4x^2 \\
 -3x^5 - 4x^4 \\
 \hline
 6x^4 + 11x^3 + 4x^2 \\
 6x^4 + 8x^3 \\
 \hline
 3x^3 + 4x^2 \\
 3x^3 + 4x^2 \\
 \hline
 0
 \end{array}$$

0

$$(2x^2 + 3x + 1) : (x + 1) = 2x + 1$$

$$\begin{array}{r} 2x^2 + 3x + 1 \\ \underline{2x^2 + 2x} \\ x + 1 \\ \underline{x + 1} \\ 0 \end{array}$$

$$(x^4 + x^3 + 2x^2 + x + 1) : (x^2 + 1) = x^2 + x + 1$$

$$\begin{array}{r} x^4 + x^3 + 2x^2 + x + 1 \\ \underline{x^4 + x^2 + 1} \\ x^3 + x^2 + x \\ \underline{x^3 + x} \\ x^2 + 1 \\ \underline{x^2 + 1} \\ 0 \end{array}$$

$$(6x^5 + 6x^4 - 5x^3 + 7x^2 - 6x + 2) : (3x^2 + 2) = 2x^3 + 2x^2 - 3x + 1$$

$$\begin{array}{r} 6x^5 + 6x^4 - 5x^3 + 7x^2 - 6x + 2 \\ \underline{6x^5 + 4x^3 + 2} \\ 6x^4 - 9x^3 + 7x^2 - 6x + 2 \\ \underline{6x^4 + 4x^2} \\ -9x^3 + 3x^2 - 6x + 2 \\ \underline{-9x^3 - 6x} \\ 3x^2 + 2 \\ \underline{3x^2 + 2} \\ 0 \end{array}$$

$$(-6x^6 - x^5 - 8x^4 + 7x^3 + 2x^2 + 6x) : (2x^2 + x + 3) = -3x^4 + x^3 + 2x$$

$$\begin{array}{r} -6x^6 - x^5 - 8x^4 + 7x^3 + 2x^2 + 6x \\ \underline{-6x^6 - 3x^5 - 9x^4} \\ 2x^5 + x^4 + 7x^3 + 2x^2 + 6x \\ \underline{2x^5 + x^4 + 3x^3} \\ 4x^3 + 2x^2 + 6x \\ \underline{4x^3 + 2x^2 + 6x} \\ 0 \end{array}$$