Mathematik LK 11 M2, AB 11 – Polynomdivision **13.01.2016**

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

```
 4x^3  +  x^2
 ──────────────────────────
        - 4x^2  + 7x  + 2
        - 4x^2  -  x
        ──────────────────
                    8x  + 2
                    8x  + 2
                    ───────
                          0
```

(4x^3 + 10x^2 + 4x + 2) : (4x^2 + 2x + 1) = x + 2 Rest -x

```
 4x^3  +  2x^2  +  x
 ──────────────────────────────
            8x^2  + 3x  + 2
            8x^2  + 4x  + 2
            ──────────────────
                    - x
```

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

```
 4x^7  - 2x^6  + 5x^5          -  x^3
 ──────────────────────────────────────────────────────
                            8x^4  - 4x^3  + 10x^2  - 2
                            8x^4  - 4x^3  + 10x^2  - 2
                            ──────────────────────────
                                                    0
```

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

```
 2x^7  + 2x^5  + 3x^4
 ──────────────────────────────────────────────
           2x^5  + 2x^4  + 2x^3  + 5x^2  + 3x
           2x^5          + 2x^3  + 3x^2
           ──────────────────────────────────
                     2x^4          + 2x^2  + 3x
                     2x^4          + 2x^2  + 3x
                     ──────────────────────────
                                           0
```

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

```
 8x^5  - 6x^3  - 4x^2
 ──────────────────────────────────
           8x^3          - 6x  - 4
           8x^3          - 6x  - 4
           ──────────────────────
                               0
```

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

```
 6x^5  + 2x^4
```

```
 ____________________________________
                    3x^2  - 2x  - 1
                    3x^2  +  x
                    ___________________
                           - 3x  - 1
                           - 3x  - 1
                           ___________
                                     0
```

```
(4x^5  + 4x^4  + x^2       - 1) : (4x^4 + x - 1)  =  x + 1
 4x^5          + x^2  - x
 ____________________________________
           4x^4         + x  - 1
           4x^4         + x  - 1
           ____________________________
                                0
```

```
(6x^2  + 5x  + 1) : (3x + 1)  =  2x + 1
 6x^2  + 2x
 ____________________
           3x  + 1
           3x  + 1
           _________
                  0
```

```
(2x^2  + 3x  + 1) : (2x + 1)  =  x + 1
 2x^2  +  x
 ____________________
           2x  + 1
           2x  + 1
           _________
                  0
```

```
(3x^3  + 2x^2  - 2x  - 1) : (3x^2 - x - 1)  =  x + 1
 3x^3  -  x^2  -  x
 ___________________________________
           3x^2  -  x  - 1
           3x^2  -  x  - 1
           ___________________
                            0
```

```
( - 3x^5  + 2x^4  + 11x^3  + 4x^2) : (3x + 4)  =  -x^4 + 2x^3 + x^2
  - 3x^5  - 4x^4
 ____________________________________
              6x^4  + 11x^3  + 4x^2
              6x^4  +  8x^3
              ____________________________
                        3x^3  + 4x^2
                        3x^3  + 4x^2
                        ____________
```

0

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

$2x^2 + 2x$

$x + 1$

$x + 1$

0

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

$x^4 + x^2$

$x^3 + x^2 + x + 1$

$x^3 + x$

$x^2 + 1$

$x^2 + 1$

0

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

$6x^5 + 4x^3$

$6x^4 - 9x^3 + 7x^2 - 6x + 2$

$6x^4 + 4x^2$

$- 9x^3 + 3x^2 - 6x + 2$

$- 9x^3 - 6x$

$3x^2 + 2$

$3x^2 + 2$

0

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

$- 6x^6 - 3x^5 - 9x^4$

$2x^5 + x^4 + 7x^3 + 2x^2 + 6x$

$2x^5 + x^4 + 3x^3$

$4x^3 + 2x^2 + 6x$

$4x^3 + 2x^2 + 6x$

0