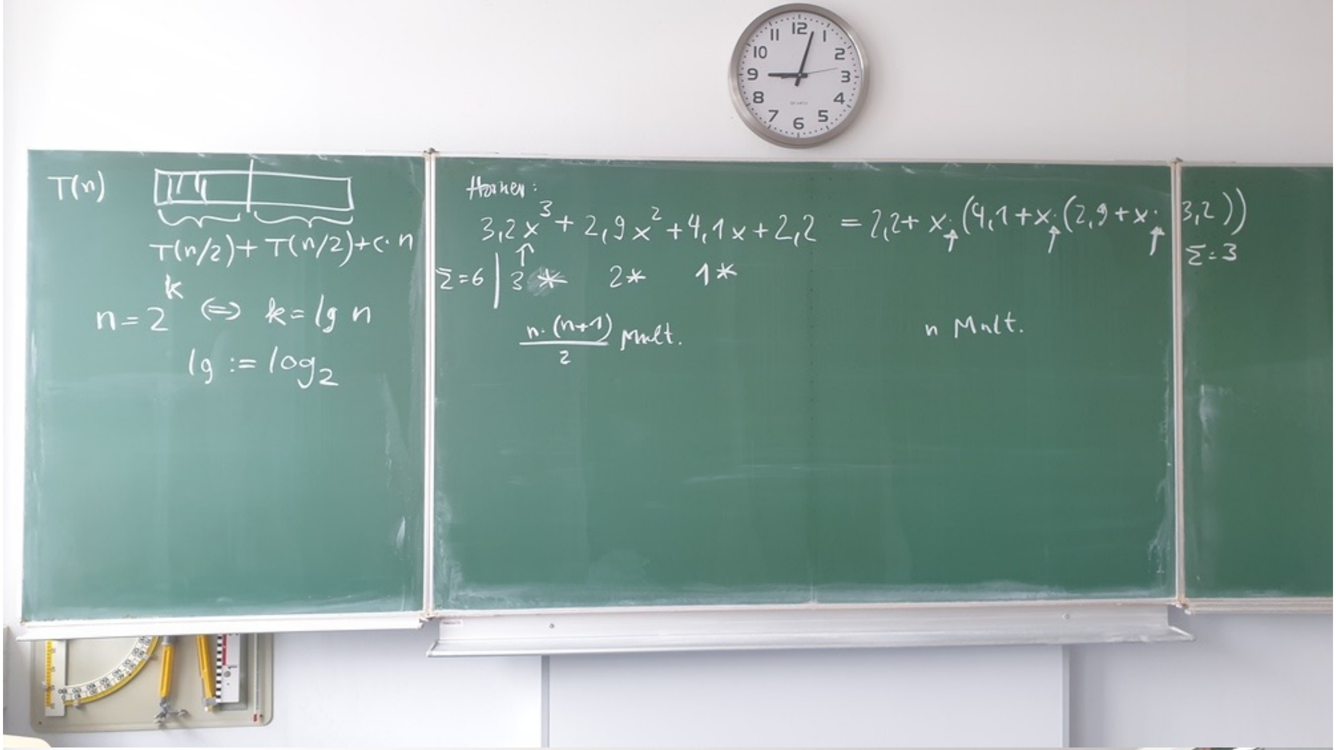
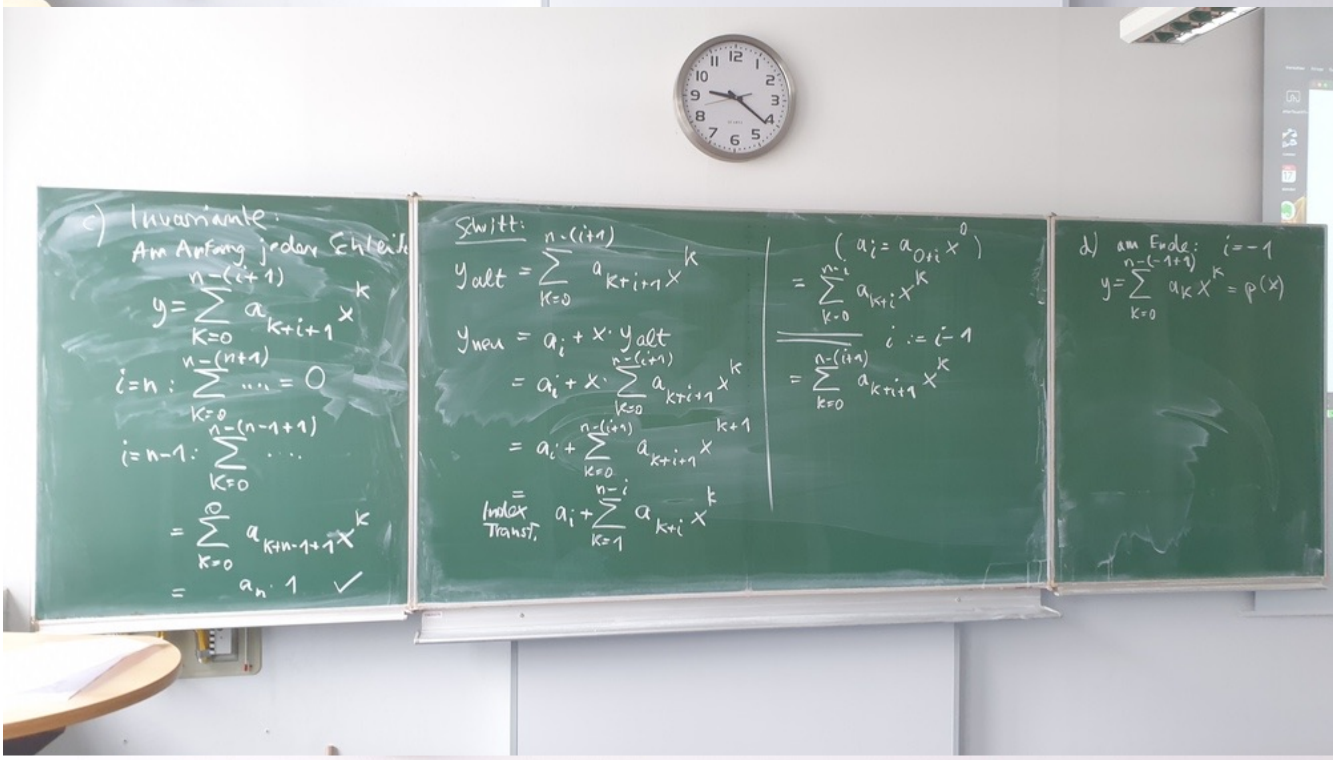
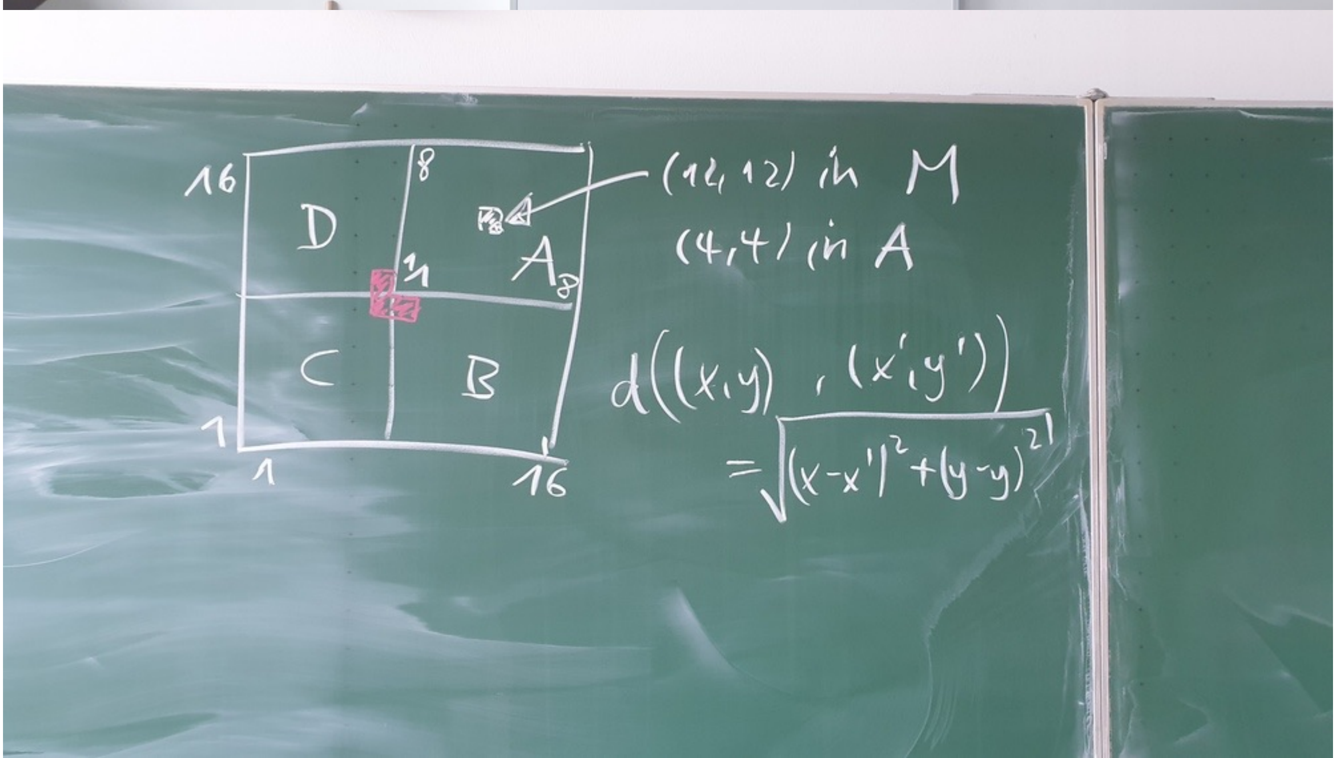
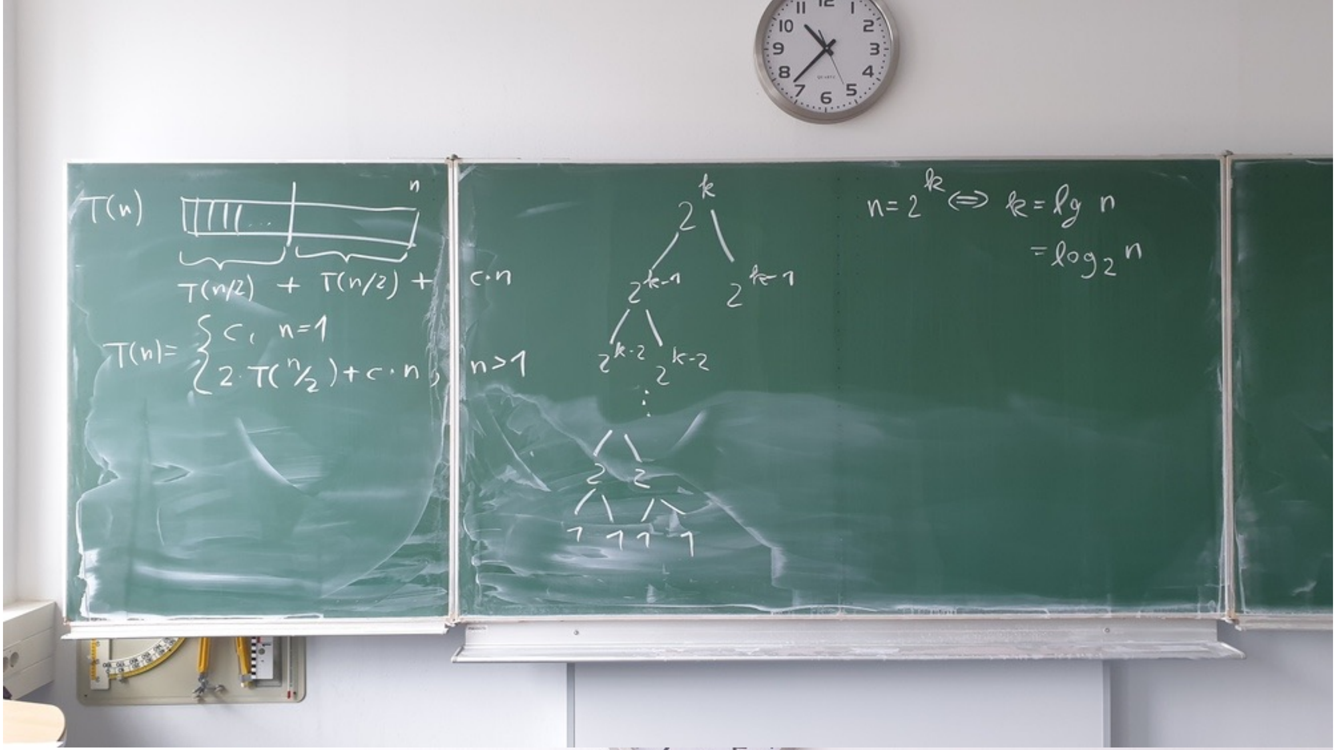
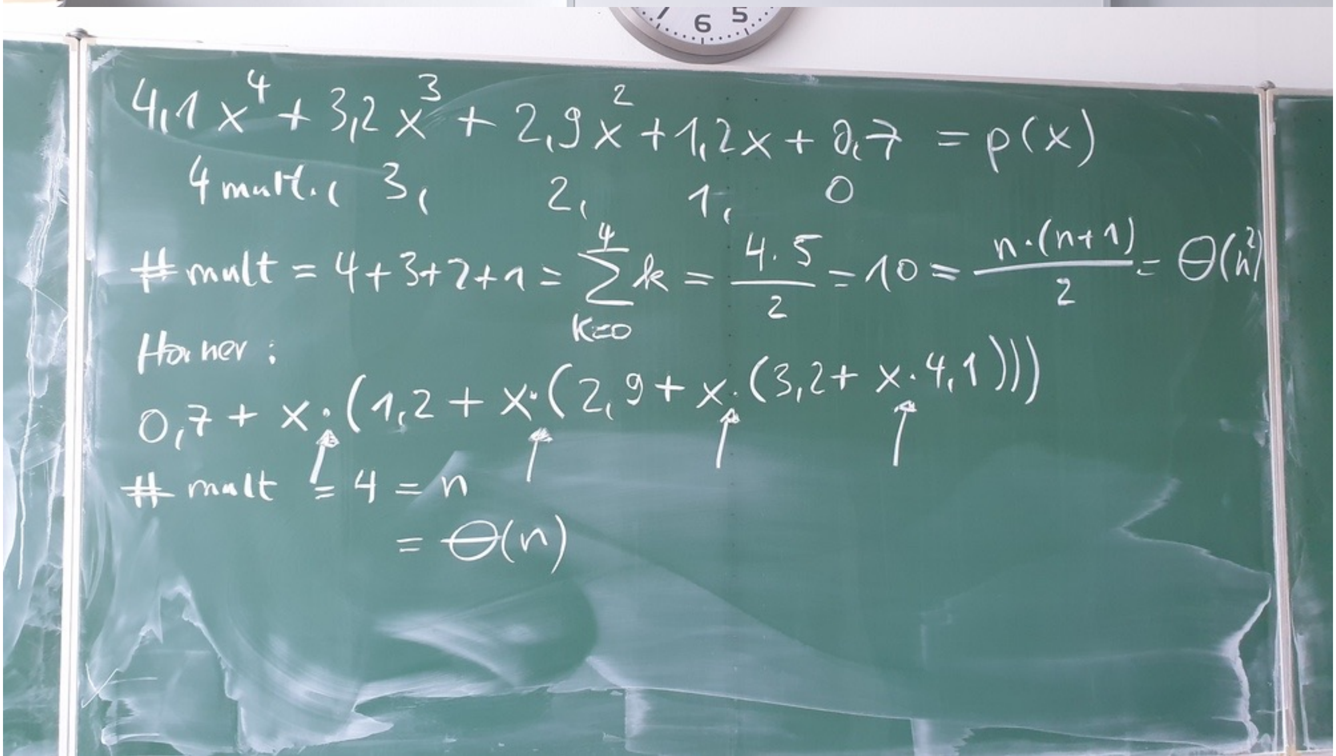
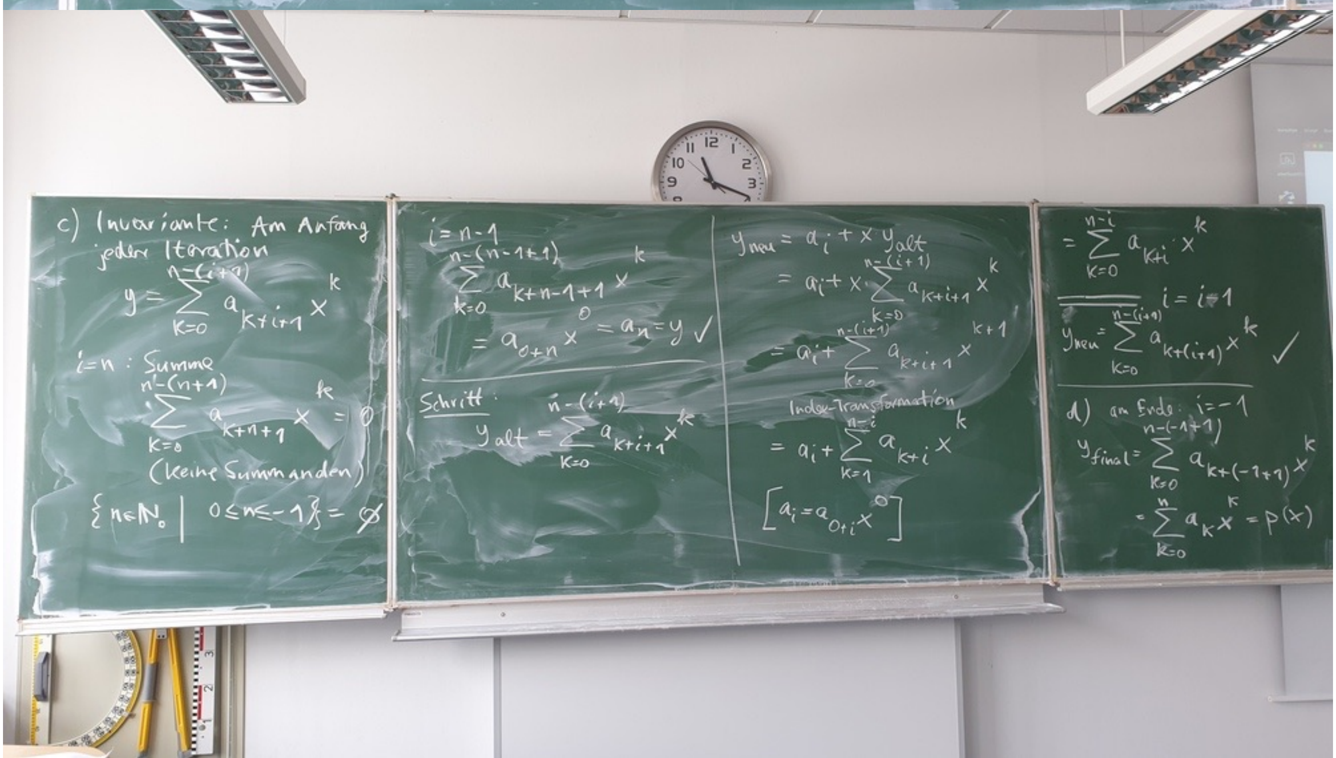

$T(n)$
$T(n/2)+T(n/2)+c\cdot n$
$n=2^k \Leftrightarrow k=\lg n$
$\lg := \log_2$
Horner:
$3{,}2x^3+2{,}9x^2+4{,}1x+2{,}2 = 2{,}2+x\cdot(4{,}1+x\cdot(2{,}9+x\cdot 3{,}2))$
$\Sigma=6$ | 3 * 2 * 1 *
$\frac{n\cdot(n+1)}{2}$ Mult.
n Mult.
$\Sigma=3$

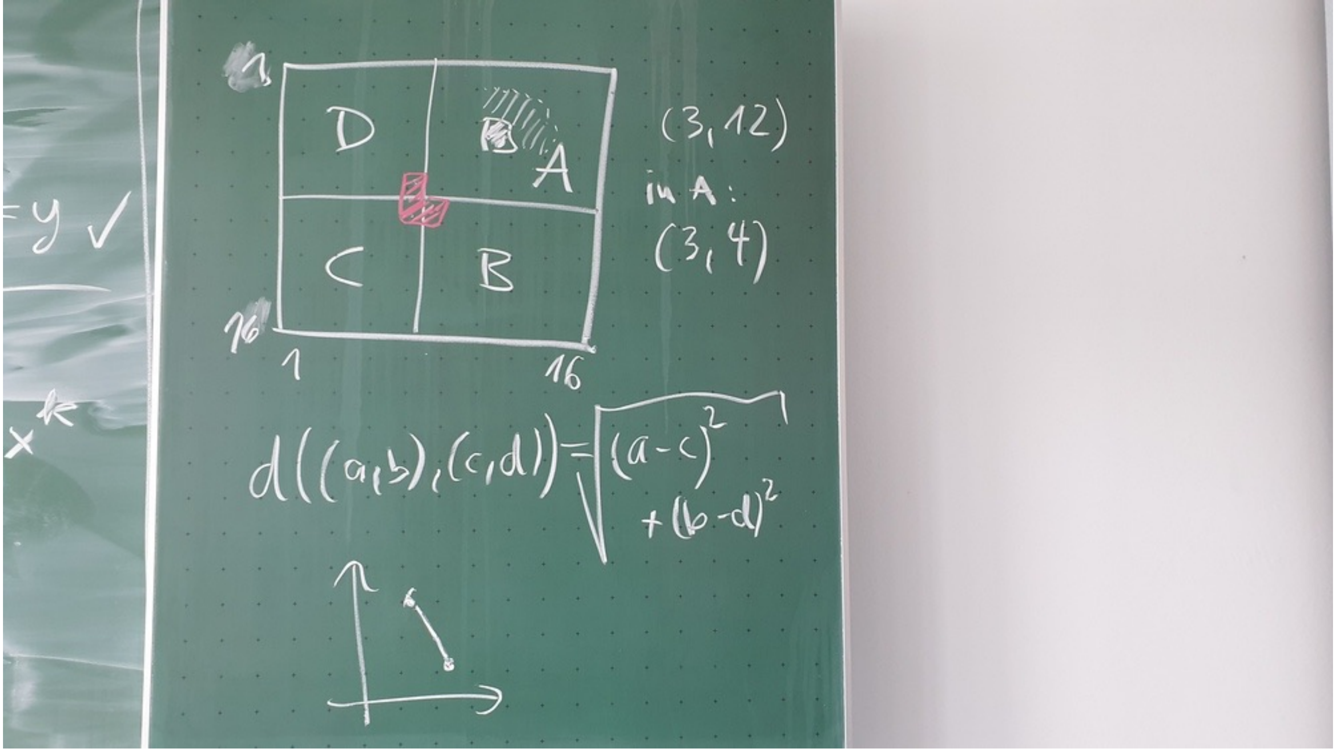

c) Invariante:
Am Anfang jeder Schleife
$y=\sum_{k=0}^{n-(i+1)} a_{k+i+1}x^k$
$i=n: \sum_{k=0}^{n-(n+1)} \dots = 0$
$i=n-1: \sum_{k=0}^{n-(n-1+1)} \dots$
$= \sum_{k=0}^{0} a_{k+n-1+1}x^k$
$= a_n \cdot 1$ ✓
Schritt:
$y_{alt} = \sum_{k=0}^{n-(i+1)} a_{k+i+1}x^k$
$y_{neu} = a_i + x\cdot y_{alt}$
$= a_i + x\cdot \sum_{k=0}^{n-(i+1)} a_{k+i+1}x^k$
$= a_i + \sum_{k=0}^{n-(i+1)} a_{k+i+1}x^{k+1}$
Index Transf.
$= a_i + \sum_{k=1}^{n-i} a_{k+i}x^k$
$(a_i = a_{0+i}x^0)$
$= \sum_{k=0}^{n-i} a_{k+i}x^k$
$i := i-1$
$= \sum_{k=0}^{n-(i+1)} a_{k+i+1}x^k$
d) am Ende: $i=-1$
$y=\sum_{k=0}^{n-(-1+1)} a_k x^k = p(x)$


16
8
D
A
C
B
1
1
16
(12, 12) in M
(4, 4) in A
$d((x,y),(x',y'))$
$=\sqrt{(x-x')^2+(y-y)^2}$


$T(n)$
n
$T(n/2) + T(n/2) + c \cdot n$
$T(n) = \begin{cases} c, & n=1 \\ 2 \cdot T(n/2) + c \cdot n, & n>1 \end{cases}$
2^k
2^{k-1} 2^{k-1}
2^{k-2} 2^{k-2}
2 2
1 1 1 1
$n = 2^k \iff k = \lg n$
$= \log_2 n$


$4{,}1x^4 + 3{,}2x^3 + 2{,}9x^2 + 1{,}2x + 0{,}7 = p(x)$
4 mult., 3, 2, 1, 0
$\# \text{mult} = 4+3+2+1 = \sum_{k=0}^{4} k = \frac{4 \cdot 5}{2} = 10 = \frac{n \cdot (n+1)}{2} = \Theta(n^2)$
Horner:
$0{,}7 + x \cdot (1{,}2 + x \cdot (2{,}9 + x \cdot (3{,}2 + x \cdot 4{,}1)))$
$\# \text{mult} = 4 = n$
$= \Theta(n)$


c) Invariante: Am Anfang jeder Iteration
$y = \sum_{k=0}^{n-(i+1)} a_{k+i+1} x^k$
$i = n$: Summe
$\sum_{k=0}^{n-(n+1)} a_{k+n+1} x^k = 0$
(keine Summanden)
$\{ n \in \mathbb{N}_0 \mid 0 \le n \le -1 \} = \emptyset$
$i = n-1$
$\sum_{k=0}^{n-(n-1+1)} a_{k+n-1+1} x^k$
$= a_{0+n} x^0 = a_n = y$ ✓
Schritt:
$y_{alt} = \sum_{k=0}^{n-(i+1)} a_{k+i+1} x^k$
$y_{neu} = a_i + x \cdot y_{alt}$
$= a_i + x \cdot \sum_{k=0}^{n-(i+1)} a_{k+i+1} x^k$
$= a_i + \sum_{k=0}^{n-(i+1)} a_{k+i+1} x^{k+1}$
Index-Transformation
$= a_i + \sum_{k=1}^{n-i} a_{k+i} x^k$
$[a_i = a_{0+i} x^0]$
$= \sum_{k=0}^{n-i} a_{k+i} x^k$
$i = i-1$
$y_{neu} = \sum_{k=0}^{n-(i+1)} a_{k+(i+1)} x^k$ ✓
d) am Ende: $i = -1$
$y_{final} = \sum_{k=0}^{n-(-1+1)} a_{k+(-1+1)} x^k$
$= \sum_{k=0}^{n} a_k x^k = p(x)$


D
A
C
B
1
16
1
16
(3,12)
in A:
(3,4)
d((a,b),(c,d)) = √((a-c)² + (b-d)²)