Satz 3.1 (lineare Rekursion):

$$T(n) = \begin{cases} konstant, & falls\ n = 0 \\ bT(n-c) + f(n), & falls\ n \geq 1 \end{cases}$$

$$T(n) = \sum_{d=0}^{n/c} b^d f(n - cd)$$

Satz 3.2 (nichtlineare Rekursion):

$$T(n) = \begin{cases} konstant, & falls\ n = 1 \\ bT(n/c) + f(n), & falls\ n \geq 2 \end{cases}$$

$$T(n) \in \begin{cases} \Theta(n^k), & falls\ b\left(\frac{1}{c}\right)^k < 1 \\ \Theta(n^k \log n), & falls\ b\left(\frac{1}{c}\right)^k = 1 \\ \Theta(n^a), & falls\ b\left(\frac{1}{c}\right)^k > 1 \end{cases}$$

$$Hierbei\ ist\ a = \frac{\ln b}{\ln c} = \log_c b > k$$

Gaußsche Summenformel:

$$1 + 2 + \cdots + n = \sum_{k=1}^{n} k$$

$$= \frac{n(n+1)}{2}$$

$$= \frac{n^2 + n}{2}$$

$$(n-1) + (n-2) + \cdots + 1 = \sum_{k=1}^{n-1} k$$

$$= \frac{(n-1)^2 + (n+1)}{2}$$

$$= \frac{n(n-1)}{2}$$