

Erklärungen mit Beispielen

Bem: Pascalsches Dreieck  $0 \leq m \leq n$   $(a+b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$

$$3.) \binom{n}{m} = \binom{n}{n-m} \quad 5.) \binom{n+1}{k} = \binom{n}{k-1} + \binom{n}{k} \Rightarrow \binom{n+1}{k+1} = \binom{n}{k} + \binom{n}{k+1}$$

$$= \binom{n}{n-k} + \binom{n}{n-k-1}$$

3.)

$$(a+b)^0 = 1$$

$$(a+b)^1 = 1 \quad 1$$

$$(a+b)^2 = 1 \quad 2 \quad 1$$

$$(a+b)^3 = 1 \quad 3 \quad 3 \quad 1$$

$$(a+b)^4 = 1 \quad 4 \quad 6 \quad 4 \quad 1$$

$$(a+b)^5 = 1 \quad \underbrace{\binom{5}{1}}_{=5} a^1 b^{5-1} \quad \underbrace{\binom{5}{2}}_{=10} a^2 b^{5-2} \quad \underbrace{\binom{5}{3}}_{=10} a^3 b^{5-3} \quad \underbrace{\binom{5}{4}}_{=5} a^4 b^{5-4} \quad 1$$

$$(a+b)^6 = 1 \quad 6 \quad \underbrace{\binom{5+1}{1+1}}_{=15} a^2 b^{6-2} \quad 20 \quad \underbrace{\binom{5+1}{4+1}}_{=15} a^4 b^{6-4} \quad 6 \quad 1$$

$$+ \underbrace{\binom{5}{4}}_{=5} = \underbrace{\binom{5+1}{1+1}}_{=15} = \underbrace{\binom{5}{1}}_{=5} + \underbrace{\binom{5}{2}}_{=10} + \underbrace{\binom{5}{3}}_{=10}$$

$$= \underbrace{\binom{5+1}{3+1}}_{=15}$$

$$+ \binom{5}{5-3-1} = 5$$

$$= \binom{5}{5-1} + \binom{5}{5-1-1} = \binom{5}{5-3}$$