

# Pascals trekant

$\text{I} \begin{pmatrix} 0 \\ 0 \end{pmatrix}$	$\text{I} \begin{pmatrix} 1 \\ 0 \end{pmatrix}$	$\text{I} \begin{pmatrix} 1 \\ 1 \end{pmatrix}$
$\text{I} \begin{pmatrix} 2 \\ 0 \end{pmatrix}$	$\text{Z} \begin{pmatrix} 2 \\ 1 \end{pmatrix}$	$\text{I} \begin{pmatrix} 2 \\ 2 \end{pmatrix}$
$\text{I} \begin{pmatrix} 3 \\ 0 \end{pmatrix}$	$\text{Z} \begin{pmatrix} 3 \\ 1 \end{pmatrix}$	$\text{I} \begin{pmatrix} 3 \\ 2 \end{pmatrix}$
$\text{I} \begin{pmatrix} 4 \\ 0 \end{pmatrix}$	$\text{Z} \begin{pmatrix} 4 \\ 1 \end{pmatrix}$	$\text{I} \begin{pmatrix} 4 \\ 2 \end{pmatrix}$
$\text{I} \begin{pmatrix} 5 \\ 0 \end{pmatrix}$	$\text{S} \begin{pmatrix} 5 \\ 1 \end{pmatrix}$	$\text{I} \begin{pmatrix} 5 \\ 2 \end{pmatrix}$
$\text{I} \begin{pmatrix} 6 \\ 0 \end{pmatrix}$	$\text{S} \begin{pmatrix} 6 \\ 1 \end{pmatrix}$	$\text{I} \begin{pmatrix} 6 \\ 2 \end{pmatrix}$
$\text{I} \begin{pmatrix} 7 \\ 0 \end{pmatrix}$	$\text{Z} \begin{pmatrix} 7 \\ 1 \end{pmatrix}$	$\text{I} \begin{pmatrix} 7 \\ 2 \end{pmatrix}$

Legg merke til møsteret! Det gir oss

## Pascals identitet

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

Sjekk med tabellen! La  $n = 5$ , og  $k = 4$ :

$$\binom{5+1}{4} = \binom{6}{4} = \binom{6}{6-4} = \binom{6}{2} = 15$$

$$\binom{5}{1} + \binom{5}{2} = 5 + 10 = 15 \text{ Stemmer!}$$

## Kjente summer

- $2^n = \binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \dots + \binom{n}{n} = \sum_{r=0}^n \binom{n}{r}$

Bevis:  $2^n = (1+1)^n = \sum_{r=0}^n \binom{n}{r} 1^r \cdot 1^{n-r} = \sum_{r=0}^n \binom{n}{r}$

- $\sum_{r=0}^n (-1)^r \binom{n}{r} = 0$

Bevis:  $0 = 0^n = (-1+1)^n = \sum_{r=0}^n \binom{n}{r} (-1)^r \cdot 1^{n-r}$   
 $= \sum_{r=0}^n \binom{n}{r} (-1)^r$