

Combinations

Formula

$$\binom{n}{k} = \frac{n!}{k!(n-k)!} = \frac{n(n-1)\dots(n-k+1)}{k(k-1)\dots 1},$$

which can be written using factorials as whenever $k \leq n$

Example 1

$$\binom{5}{2} = \frac{5!}{2!(5-2)!} = \frac{5 \cdot 4 \cdot 3!}{2! \cdot 3!} = \frac{5 \cdot 4}{2 \cdot 1} = 10$$

Example 2

$$\binom{5}{0} = \frac{5!}{0!(5-0)!} = \frac{5!}{0! \cdot 5!} = \frac{5!}{2!} = 1$$

Recall $0! = 1$