

$$[1.8] \quad (x+1)^n = \sum_{i=0}^n \binom{n}{i} x^{n-i} \quad \text{Setting } x=1 \Rightarrow 2^n = \sum_{i=0}^n \binom{n}{i} = 1 + n + \frac{1}{2}n(n-1) + \dots + 1$$