$$(x+y)^n = \sum_{k=0}^{n} \binom{n}{k} x^k y^{n-k}$$

Binomial Random Variable (Independent Trials Model)

- ***n*** independent Bernoulli trials [with a Success or Failure (*S* or *F*) on each]
- P(Success) = p for each trial
- **X** = # of Successes in ***n*** independent trials → **X** ~ Binomial(n, p)
- PMF: $f(x) = P(X = x) = \binom{n}{x} p^x (1-p)^{n-x}$
- If $X_1, X_2, \ldots, X_n$ are indep. Bernoulli(p) RVs (a *Random Sample* of size n from the distribution) Then **X** = $X_1 + X_2 + \ldots + X_n$ is a Binomial(n, p) RV

X = # of pips on a die

F(x) = P(X<=x)