


tossing a coin N times

$N=5 \quad \{(H,H,H,H,H) \dots (T,T,T,T,T)\}$

↓ number of heads X

$\{5, \dots, 0\}$

$$P(X=m | N, p) = \binom{N}{m} p^m \cdot (1-p)^{N-m}$$

$$\frac{N!}{(N-m)! m!}$$

$$\rightarrow e^{\ln \frac{N!}{(N-m)! m!}}$$

$$= e^{\ln N! - \ln (N-m)! - \ln m!}$$

$$\downarrow$$
$$\ln N \cdot (N-1) \dots 1 = \ln N + \ln(N-1) + \dots + \ln 1$$