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tossing a coin  $\textcircled{N}$  times

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

↓ number of heads  $X$

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

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

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

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

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

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