$N_1 = 100$ units + Mark

$N_2 = 100$ units 50 mark

Pop estimate 200 mits in theory

Lpostinch $50/100 = \frac{100}{.5} = 200$

5 Nights unique marks

- Assess Species
  Age Class
  Sex

probability Heterogeneous over time

Sample size to observe/assess Variation in Heterogeneity of trap response?

- Simulation

Classic "Urn" Problem

N animals total

M marked

n sample size

m ? # marked in the sample

$$p(m \mid \hat{N}, M, n) = \frac{\dfrac{M!}{m!(M-m)!}\,\dfrac{(N-M)!}{(n-m)!(N-M-n+m)!}}{\dfrac{N!}{n!(N-n)!}}$$

Bootstrapable

Gamma Function

$\text{Gamma}(n-1) \equiv n!$

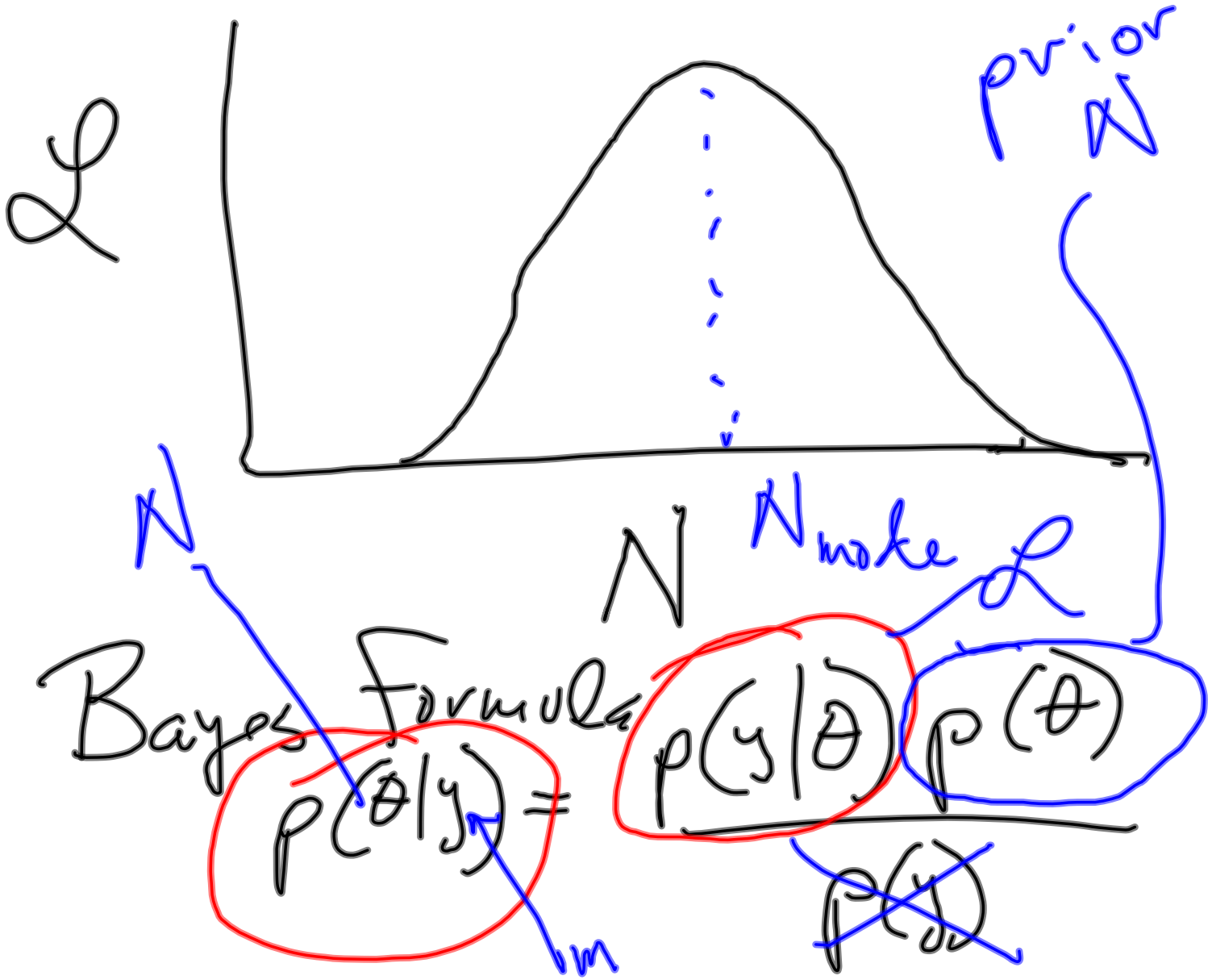
Log Gamma

$$p(m \mid N, M, n) = \text{unknown parameter}$$

data

$$\frac{\dfrac{M!}{m!(M-m)!}\,\dfrac{(N-M)!}{(n-m)!(N-M-n+m)!}}{\dfrac{N!}{n!(N-n)!}}$$

$$= \mathcal{L}$$


prior
N
N
N
Bayes Formula
$p(\theta|y) = \frac{p(y|\theta)\,p(\theta)}{p(y)}$