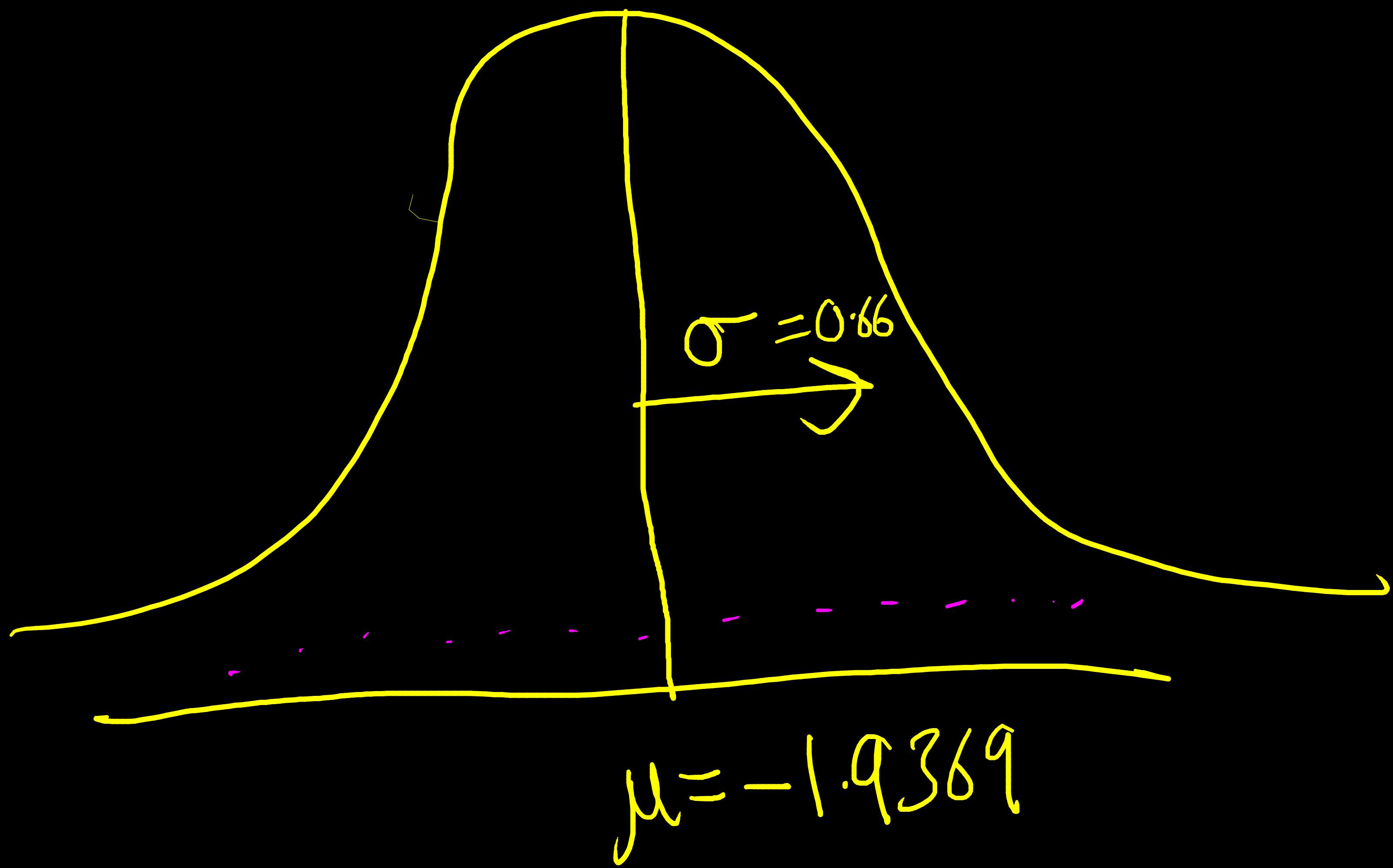
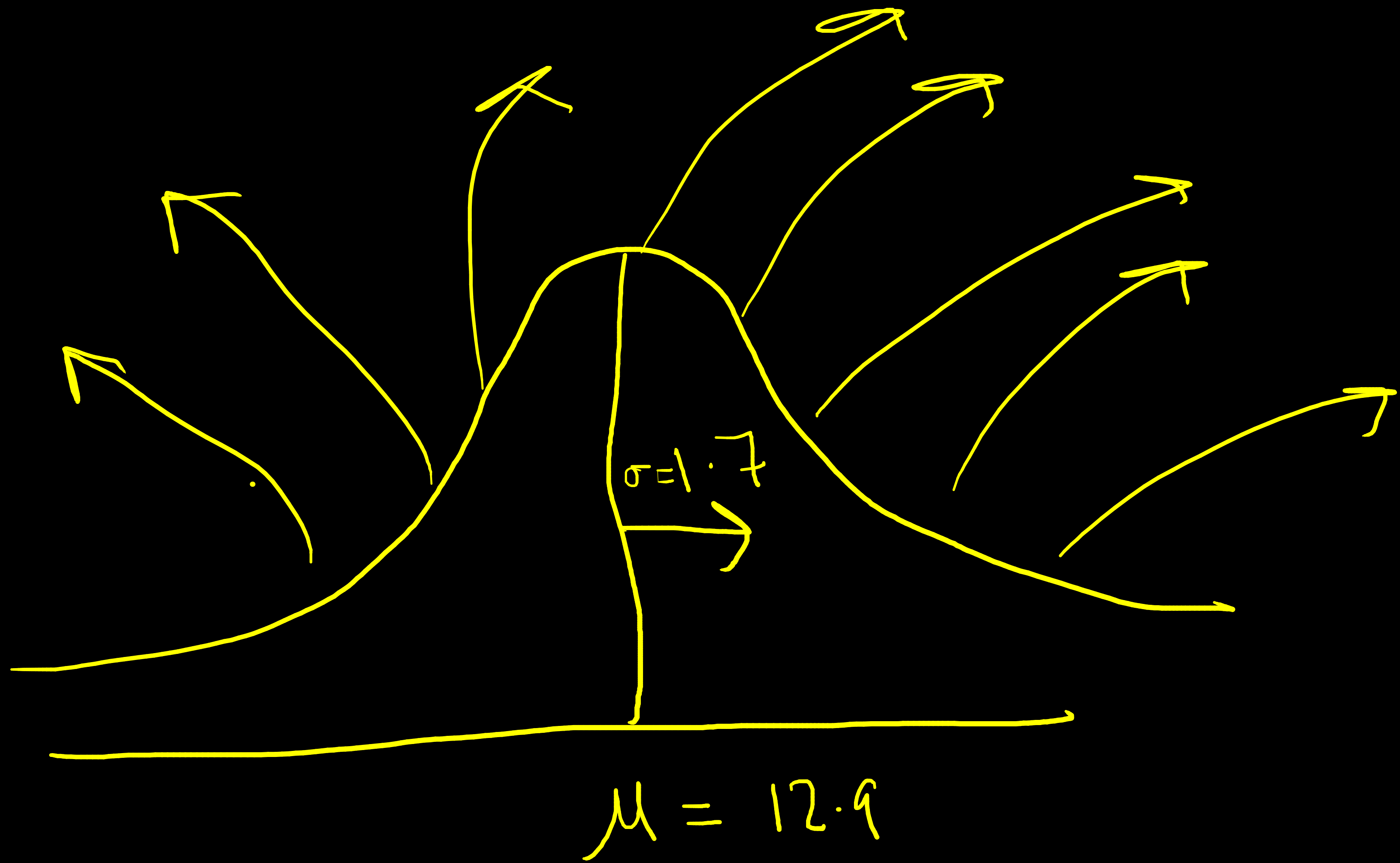
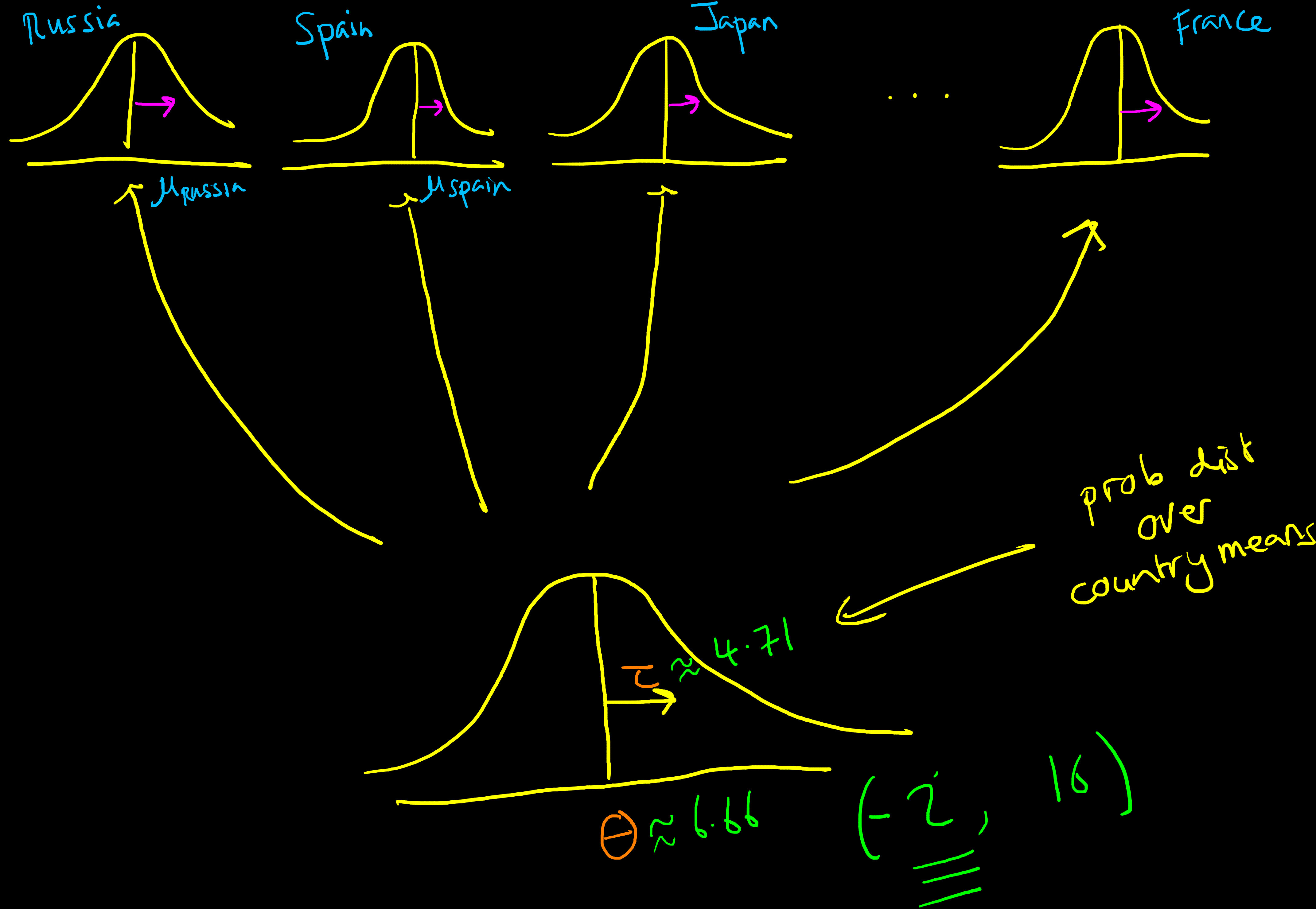

$\sigma = 0.66$
$\mu = -1.9369$



σ=1·7
μ = 12·9



Russia
Spain
Japan
France
. . .
μ_{Russia}
μ_{Spain}
prob dist over country means
$\tau \approx 4.71$
$\theta \approx 6.66$
$(-2, 16)$

for j in $1 \dots J$

for i in $1 \dots n_j$

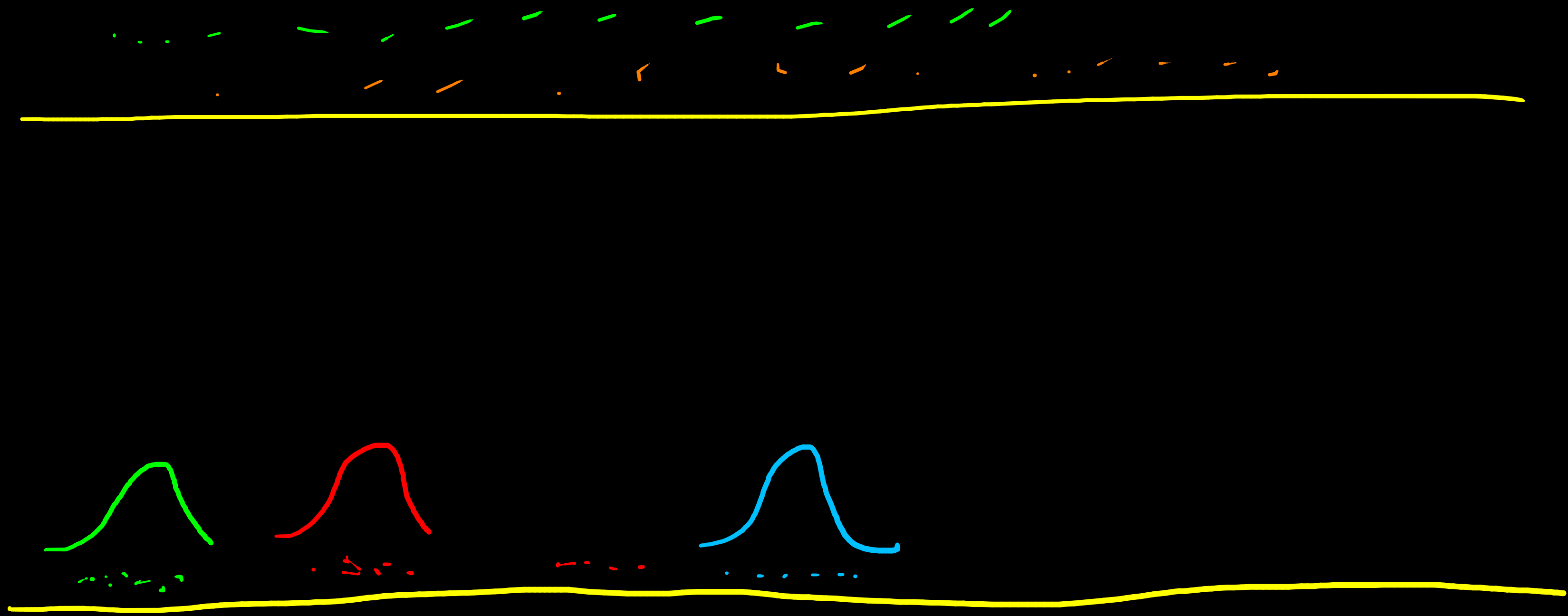
$$y_{ji} \sim N(\mu_j, \sigma^2)$$

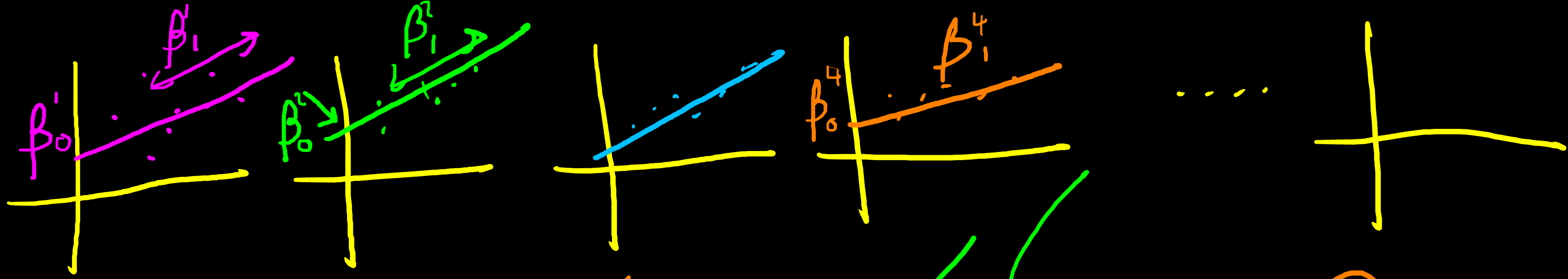
$$\mu_j \sim N(\theta, \tau^2)$$

$n_j = 12$

$Z_j = \mu_j - \theta$

$$\begin{cases} y_{ji} = \theta + Z_j + \varepsilon_{ji} \\ Z_j \sim N(0, \tau^2) \; ; \; \varepsilon_{ji} \sim N(0, \sigma^2) \end{cases}$$

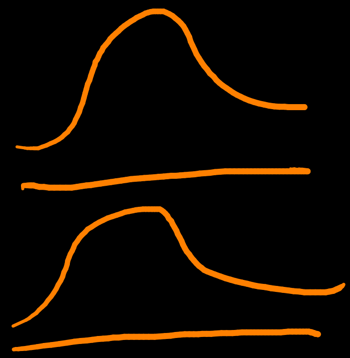




for j in 1… J

$$\beta_0^j \sim N(b_0, \tau_0^2)$$

$$\beta_1^j \sim N(b_1, \tau_1^2)$$



for i in 1…n

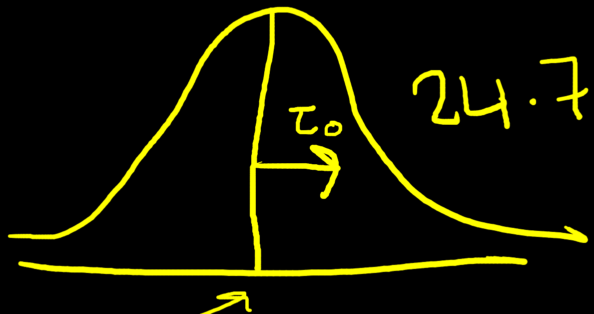
$$y_i \sim N(\mu_i, \sigma^2)$$

$$\mu_i = \beta_0 + \beta_1 x_i$$

$$\mu = \beta_0 + \beta_1 x$$

$$= \beta_0 \times 1 + \beta_1 \times x$$

intercepts



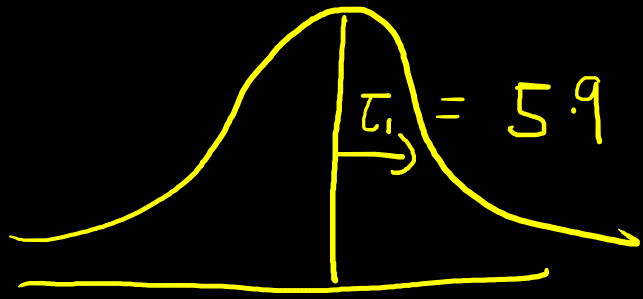
24.741

$b_0 = 251.4$

$95\% \approx (200, 300)$

interval over subject specific intercepts

slope

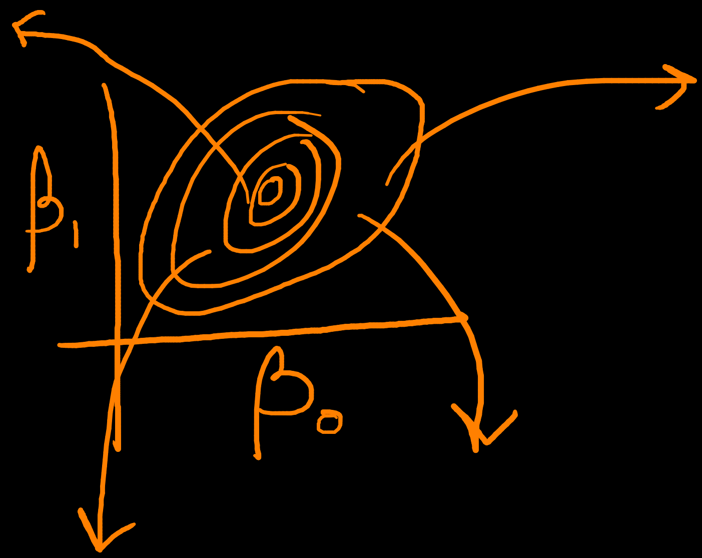


$= 5.9$

$b_1 = 10.47$

$10 - 12, 10 + 12$

$(-2, 22)$



$$\begin{bmatrix} \beta_0 \\ \beta_1 \end{bmatrix} \sim N\left(\begin{bmatrix} b_0 \\ b_1 \end{bmatrix}, \Sigma \right)$$

$$\Sigma = \begin{bmatrix} \sigma_0^2 & \sigma_0 \sigma_1 \rho \\ \sigma_0 \sigma_1 \rho & \sigma_1^2 \end{bmatrix}$$