

$$\pi(\theta_1 | x_1, \dots, x_n) \propto f(x_1, \dots, x_n | \theta_1) \pi(\theta_1)$$

$$\propto \prod_{i=1}^n \left[\frac{\theta_1 e^{\theta_1}}{\Gamma(e^{\theta_1})} \cdot x_i^{e^{\theta_1}-1} \cdot e^{-\theta_1 x_i} \right] \cdot \frac{1}{\sqrt{40\pi}} e^{-\frac{\theta_1^2}{40}}$$

~~constant~~

$$\propto \theta_1^{ne^{\theta_1}} \cdot \left(\prod_{i=1}^n x_i \right)^{e^{\theta_1}-1} \cdot \frac{e^{-n\theta_1}}{\prod_{i=1}^n e^{-\theta_1 x_i}} \cdot \Gamma(e^{\theta_1})^{-n} \cdot e^{-\frac{\theta_1^2}{40}}$$

~~constant~~

$$\propto \exp \left\{ \log(\theta_1) \cdot n \cdot e^{\theta_1} + \left(\sum_{i=1}^n \log(x_i) \right) (e^{\theta_1} - 1) + \log(\Gamma(e^{\theta_1})) (-n) - \frac{1}{40} \theta_1^2 \right\}$$

$$\propto \exp \left\{ -\frac{1}{40} \theta_1^2 + n e^{\theta_1} \log(\theta_1) - n \log(\Gamma(e^{\theta_1})) + (e^{\theta_1} - 1) \sum_{i=1}^n \log(x_i) \right\}$$