1 —

$$\underset{P}{\text{argmax}} \quad f(x_1, x_2, \dots x_n \,; P)$$

$$\underset{P}{\text{argmax}} \prod_{i=1}^{n} f(x_i \,; P) = \underset{P}{\text{argmax}} \prod_{i=1}^{n} P\,(1-P)^{k-1}$$

$$\underset{P}{\text{argmax}} \quad P^n (1-p)^{\Sigma k - n}$$

$$0 = n p^{n-1}(1-p)^{\Sigma k - n} + p^n \left[(\Sigma k - n)(1-p)^{\Sigma k - n - 1}\right](-1)$$

$$0 = p^{n-1}(1-p)^{\Sigma k - n - 1}\left(n(1-p) + p(n - \Sigma k)\right)$$

$$P : 1, 0, \frac{n}{\Sigma k}$$

$$n - np + np - p\,\Sigma k = 0$$

$$P = \frac{n}{\Sigma k}$$

2 —

Sample mean $= \frac{1}{n}\Sigma X_i = 168,83$

$$S_n^2 = \frac{1}{n-1}\left(\Sigma (x - E(x))^2\right) \rightarrow m_n \text{ kullanacağız}$$

Dağılımını bilmiyoruz. Yeterli

n için $\quad m_n \cong E(x)$

$$= \frac{1}{6}\left(4 + 6,6 + 0,6 + 100 + 0 + 108 + 3\right) = \frac{222}{6} = 37$$

$$\text{std} = \sqrt{S_n^2} = 6,9$$

3-

a) $Z_n = \dfrac{34.5 - \mu}{\sqrt{\dfrac{55.2}{144}}} = \dfrac{34.5 - \mu}{0.6} \sim N(0,1)$

$\Phi(Z) = 0.05 \xrightarrow{\hspace{2cm}} 1.65$

$Z \in [-1.65 , 1.65]$

$\mu \in [\ 0.6(-1.65) + 34.5 \ , \ 0.6(1.65) + 34.5\ ]$

$\mu \in [\ 33.5 \ , \ 35.5\ ]$

b)

$Z_n = \dfrac{16.7 - \mu}{\sqrt{\dfrac{7.5}{16}}} \sim N(0,1) = \dfrac{16.7 - \mu}{0.68}$

Burada $\Psi_{15}(Z) = 0.025$ kullanıyorum normal

dağılım olduğu için

$Z \in [-2.131 , 2.131]$

$\mu \in [\ 0.68 \cdot (-2.131) + 16.7 \ , \ 0.68(-2.131) + 16.7\ ]$

4—

a) $P(x > \varepsilon \mid \lambda = 23) = 0,1$

$$P(\lambda e^{-\lambda x} \geq \varepsilon \mid \lambda = 23) = 0,1$$

$$0,1 = \int_{\varepsilon}^{\infty} 23 e^{-23x} \, dx$$

$$-e^{-23x} \Big|_{\varepsilon}^{\infty} = e^{-23\varepsilon} = 0,1$$

$$\varepsilon = \ln(0,1)(-23) \cong 53$$

b) $P(x < \varepsilon^{53} \mid \lambda = 1) = ?$

$$P(e^{-1x} < 53) = ?$$

$$\int_{-\infty}^{53} e^{-x} \, dx = -e^{-x} \Big|_{53}^{-\infty}$$

$$= e^{-53} = 9,6 \cdot 10^{-24}$$

O'a çok yakın