

823 Homework 4 Q3

$$A) \frac{1}{1+x} < 1 \rightarrow 1 < (1+x)$$

$$x > 0$$

$$g^*(x) = \begin{cases} 1 & x > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$B) E[\min\{\eta[x], 1 - \eta[x]\}]$$

$$\int_0^1 1 - \frac{1}{1+x} \exp(-x) dx = .17$$

$$\int_1^{\infty} \frac{1}{1+x} \exp(-x) dx = .13$$

$$13 + 17 = \boxed{3}$$

Question 4

likelihood:

$$l(\mu, \xi) = \prod_{i=1}^k \frac{\Gamma(\xi + k)}{k! \Gamma(\xi)} \left(\frac{\xi}{\mu + \xi} \right)^\xi \left(\frac{\mu}{\mu + \xi} \right)^k \quad k=0,1,2,\dots$$

Gradient Vector:

$$D_k l(k; \mu, \xi) = \begin{pmatrix} \frac{\partial}{\partial \mu} l(\mu, \xi) \\ \frac{\partial}{\partial \xi} l(\mu, \xi) \end{pmatrix}$$