

QUIZ 1

COURSE NAME: STATISTICAL INFERENCE

COURSE CODE: MA 380

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$$\Gamma(n) = \int_0^{\infty} x^{n-1} e^{-x} dx$$

Instructions: Answer all questions

1. What is Statistical Inference ?
2. What is Estimation?
3. Let  $X_1, \dots, X_n$  be a random sample of size  $n$  from a gamma distribution with

$$f(x; \alpha; \beta) = \frac{\beta^\alpha}{\Gamma(\alpha)} x^{\alpha-1} e^{-\beta x} ; x > 0$$

$$= 0 ; \text{elsewhere}$$

Find the moment estimators of  $\alpha$  and  $\beta$

4. Given  $f(x) = \lambda e^{-\lambda x} ; x > 0$   
 $= 0 ; \text{otherwise}$

Find the M.L.E of  $\lambda$ .

$$\Gamma(\alpha+2) = \int_0^{\infty} x^{\alpha+2-1} e^{-x} dx$$

$$= \alpha+1 \Gamma(\alpha+1)$$

$$\Gamma(\alpha+1) = \alpha \Gamma(\alpha)$$

$$\Gamma(\alpha+2) = (\alpha+1) \Gamma(\alpha+1)$$

$$\Gamma(\alpha+3-1)+1 \rightarrow$$

$$(\alpha+2)+1 = \alpha+2 \Gamma(\alpha+2)$$

$$(\alpha+3) \Gamma(\alpha+3)$$

$$\Gamma(\alpha) = \int_0^{\infty} x^{\alpha-1} e^{-x} dx$$

$$\Gamma(\alpha+1) = \int_0^{\infty} x^\alpha e^{-x} dx$$

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