1. Let X1, . . . , Xn be a random sample from the Normal distribution with mean 4.4 and variance 1.7.

(a) What is the distribution of X_5? with what mean and variance?

Normal with   mean 4.4 and variance = 1.7

(b) What is the distribution of $\overline{X}$ when n = 50? With what mean and variance?

mean = 4.4

Variance =

(c) Calculate P $(4.4 - .1 \leq X2 \leq 4.4 + .1)$. Is your answer approximate or exact (did you use CLT)?.

(d) Calculate P $(4 \leq \overline{X} \leq 5)$. Is your answer approximate or exact(did you use CLT)?.

(e) For what value of α does P$(4.4 - \alpha \leq \overline{X} \leq 4.4 + \alpha) = 0.9$. ?

2. Let X ,...,X be a random sample from the gamma distribution with parameters $\alpha = 2$ and $\beta = 5$.

(a) What is the distribution of X_3 ? With what mean and variance?

(b) Can you calculate P ($10 - 2 \leq X_3 \leq 10 + 2$) ?

(c) Can you calculate P ($10 - 2 \leq \overline{X} \leq 10 + 2$) . Is your answer appropriate or exact ?

3. Let $X_1, \ldots, X_n$ be a random sample from the negative binomial distribution with parameters (r, p). Obtain Method of moments estimator for r and p.

4. Let X_1 , . . . , Xn be a random sample from the distribution with pdf

$$f(x) = \begin{cases} (\theta-1)x^{-\theta} & \text{if } x \geq 1 \\ 0 & \text{otherwise} \quad \text{where } \theta > 2. \end{cases}$$

(a) Obtain E(X1), in terms of

(b) Obtain Method of Moments Estimator for θ.

(c) Obtain Maximum Likelihood Estimator for θ.