EE 381 Final Exam Formula Sheet – You may write on this paper.

Name, I.D. #, Date: ____

$P(\{X = x\}) = {}_nC_x\ p^x(1-p)^{(n-x)}$ with $x = 0, 1, 2, \cdots, n$ and ${}_nC_x = \frac{n!}{(n-x)!x!}$

$\mu = np \qquad \sigma = \sqrt{np(1-p)}$

$P(\{X = x\}) = e^{-\lambda}\frac{\lambda^x}{x!} \quad \mu = \lambda \qquad P(\{Y = y\}) = p(1-p)^{(y-1)} \quad \mu = \frac{1}{p}$

$P(\{Y = k\}) = \frac{{}_rC_k\ {}_wC_{n-k}}{{}_NC_n}$ with $r + w = N$

$f_Z(z) = \frac{1}{\sqrt{2\pi}}\ e^{-(z^2/2)}$ with $-\infty < z < \infty$

$f_X(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(1/2)[(x-\mu)/\sigma]^2}$ with $-\infty < x < \infty$

$f_T(t) = \lambda e^{-\lambda t}$ for $t \geq 0$

$f_Y(y) = \frac{1}{b-a}$ with $a < y < b$

$z = \frac{X-\mu}{\sigma} \qquad z = \frac{\bar{x}-\mu}{\sigma/\sqrt{n}} \qquad z = \frac{\bar{x}-\mu}{s/\sqrt{n}} \qquad z = \frac{S_n - n\mu}{\sqrt{n}\sigma}$ with $S_n = \sum_{i=1}^{n} X_i \quad X = z\sigma + \mu$

$E(X) = \sum x f_X(x) \qquad E(X) = \int x f_X(x) \qquad E(Y) = \int g(x) f_X(x) dx$ for $Y = g(X)$

$\bar{x} - E < \mu < \bar{x} + E$ where $E = t_{\alpha/2}\frac{s}{\sqrt{n}}$ with d.f. = n – 1

$\sqrt{\frac{s^2(n-1)}{X_R^2}} < \sigma < \sqrt{\frac{s^2(n-1)}{X_L^2}}$ with d.f. = n – 1

$\bar{x} = \frac{\sum x}{n} \qquad \sigma = \sqrt{\frac{\sum(X-\mu)^2}{N}} \qquad s = \sqrt{\frac{n\sum x^2 - (\sum x)^2}{n(n-1)}}$

$1-\alpha$	$Z_{\alpha/2}$
99%	2.58
95%	1.96
90%	1.65

$\hat{p} - E < p < \hat{p} + E$ where $E = Z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

$Var(X) = E[(X-\mu)^2] \qquad Var(X) = E(X^2) - \mu^2 \qquad Cov(X,Y) = E[(X-\mu_X)(Y-\mu_Y)] = E(XY) - \mu_X\mu_Y$

$P(B|A) = \frac{P(A\cap B)}{P(A)} \qquad P(A \cap B \cap C) = P(A)P(B)P(C)$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$F_X(x) = P(\{X \leq x\}) \quad S_\infty = \frac{1}{1-\alpha}$ for $\sum_{k=0}^{\infty}\alpha^k$ where $0 < \alpha < 1$

$z = \frac{\bar{x}-\mu}{s/\sqrt{n}}$ with d.f. = n – 1 $\qquad f_Y(y) = f_X(x)\left|\frac{dx}{dy}\right|$