

STAT-319 Formula Sheet for First Major Exam Term 143

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

$$P(A \cup B) = 1 - P(A \cup B)' = 1 - P(A' \cap B') \quad \text{and} \quad P(A \cap B)' = P(A' \cup B')$$

$$P(A | B) = \frac{P(A \cap B)}{P(B)}, P(B) \neq 0 \quad \text{and} \quad P(A \cap B) = P(A) \cdot P(B | A) = P(A | B) \cdot P(B)$$

$$P(B_i | A) = \frac{P(A | B_i) \cdot P(B_i)}{\sum_{i=1}^k P(A | B_i) \cdot P(B_i)}, P(A) \neq 0$$

$$\mu = E(X) = \sum x f(x); \quad E(X^2) = \sum x^2 f(x) \quad \text{and} \quad \sigma^2 = E(X - \mu)^2 = E(X^2) - \mu^2$$

$$f(x) = \frac{1}{n}; \quad x = x_1, x_2, \dots, x_n; \quad \mu = \frac{x_n + x_1}{2}; \quad \sigma^2 = \frac{(x_n - x_1 + 1)^2 - 1}{12}$$

$$f(x) = \binom{n}{x} p^x (1-p)^{n-x}; \quad x = 0, 1, \dots, n; \quad \mu = np; \quad \sigma^2 = np(1-p)$$

$$f(x) = p(1-p)^{x-1}; \quad x = 1, 2, \dots; \quad \mu = 1/p; \quad \sigma^2 = (1-p)/p^2$$

$$f(x) = \frac{\binom{K}{x} \binom{N-K}{n-x}}{\binom{N}{n}}; \quad x = \max\{0, n + K - N\} \text{ to } \min\{K, n\}; \quad \mu = np; \quad \sigma^2 = np(1-p) \frac{N-n}{N-1}; \quad p = \frac{K}{N}$$

$$f(x) = \frac{e^{-\lambda t} (\lambda t)^x}{x!}; \quad x = 0, 1, \dots; \quad \mu = \lambda t; \quad \sigma^2 = \lambda t$$

$$F(b) = P(X \leq b) = \int_{-\infty}^b f(x) dx \quad \text{and} \quad P(a < X < b) = \int_a^b f(x) dx = F(b) - F(a)$$

$$\mu = E(X) = \int_{-\infty}^{\infty} x f(x) dx; \quad E(X^2) = \int_{-\infty}^{\infty} x^2 f(x) dx \quad \text{and} \quad \sigma^2 = E(X - \mu)^2 = E(X^2) - \mu^2$$

$$f(x) = \frac{1}{x_n - x_1}; \quad x_1 \leq x \leq x_n; \quad \mu = \frac{x_n + x_1}{2}; \quad \sigma^2 = \frac{(x_n - x_1)^2}{12}$$

$$f(x) = \lambda e^{-\lambda x}; \quad x > 0; \quad \mu = \frac{1}{\lambda}; \quad \sigma^2 = \frac{1}{\lambda^2}$$