

Exam 1 Formula Sheet

Variance

$$\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

Probability

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

$$P(A_1|B) = \frac{P(B|A_1)P(A_1)}{P(B|A_1)P(A_1) + P(B|A_2)P(A_2) + \cdots + P(B|A_k)P(A_k)}$$

Random Variables

$$\begin{aligned} E(X) &= x_1 \times P(X = x_1) + \cdots + x_k P(X = x_k) \\ &= \sum_{i=1}^k x_i P(X = x_i) \end{aligned}$$

$$\begin{aligned} \text{Var}(X) &= (x_1 - \mu)^2 \times P(X = x_1) + \cdots + (x_k - \mu)^2 \times P(X = x_k) \\ &= \sum_{j=1}^k (x_j - \mu)^2 P(X = x_j) \end{aligned}$$

$$E(aX + bY) = aE(X) + bE(y)$$

$$\text{Var}(aX + bY) = a^2 \text{Var}(X) + b^2 \text{Var}(Y)$$