

Cheat Sheet

Probability:

Rule	Expression
range	$0 \leq P(A) \leq 1$
complement	$P(A^c) = 1 - P(A)$
multiplication	$P(A \text{ and } B) = P(B A)P(A)$
addition	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
independence	$P(B A) = P(B)$
independence	$P(A \text{ and } B) = P(A)P(B)$

Factorial:

$$k! = k(k-1)(k-2) \dots (2)(1)$$

$$0! = 1$$

Permutations:

$$P_k^n = \frac{n!}{(n-k)!}$$

Combinations:

$$C_k^n = \frac{n!}{k!(n-k)!}$$

Expected Value:

$$E(X) = \mu = \sum_{i=1}^n p_i x_i$$

$$E(aX + b) = aE(X) + b$$

Variance:

$$Var(X) = \sigma^2 = \sum_{i=1}^n p_i (x_i - \mu)^2$$

$$Var(aX + b) = a^2 Var(X)$$

Binomial Probability:

$$P(X = k) = C_k^n p^k (1-p)^{n-k}$$

$$E(X) = np$$

$$Var(X) = np(1-p)$$