**Unit I Probability: Important Concepts**

Probability Basics

 P(event A occurs) =  [Theoretical probability] OR  [Empirical probability]

Complementary Events

 P(at least one) = 1 – P(none) is a special and common case of 

Non-overlapping Events
 P(A or B) = P(A) + P(B)

Overlapping Events

 P(A or B) = P(A) + P(B) – P(A and B)

Independent Events

 P(A and B) = P(A)× P(B) “With replacement”

Dependent Events

 P(A and B) = P(A)× P(B given A) “Without replacement”

Odds for an event

 = 

Expected value for a game or raffle

 E = a1×p1 + a2×p2 + a3×p3 + …

Factorial

 n! = n(n – 1)(n – 2)… 3×2×1 0! = 1 (by definition)

Permutations [Order matters; Arrangements]

 

Permutations with repeated elements (e.g., banana, bubble)

 

Combinations [Order doesn’t matter; Subsets]

 