**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]

