

Probability

$$P_{\text{Total}} = 1$$

$$0 \leq P(A) \leq 1$$

Simple Events

$$P(A) = \frac{n(A)}{n(S)}$$

Conditional Probability

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

Mutually Exclusive

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

NOT Mutually Exclusive

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

Sometimes it is easier to use the complement, $P(A) + P(A') = 1$.

Counting Principles, Permutations, and Combinations can be used to calculate the $n(A)$ and/or $n(S)$

Complex Events

OR

(Addition rule)

Independent

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

Dependent

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

AND

(Multiplication rule)