Basic Definitions

Complement of A
contains all elements that are not in A

Intersection of A and B
contains all elements that are in A and in B

Union of A and B
contains all elements that are either in A or in B or both

Disjoint Events
A and B are called disjoint events if $A \cap B = \emptyset$.

Example 1: Suppose a 6-sided die is rolled. Consider the following events:

- $A =$ the outcome is even.
- $B =$ the outcome is greater than 3.

a) List outcomes in $A$, $B$, $A'$, $A \cap B$, $A \cup B$.

b) Find the probabilities $P(A)$, $P(B)$, $P(A')$, $P(A \cap B)$, $P(A \cup B)$.
Important Set Theory Theorems

De Morgan’s Law:

\[ (A \cup B)' = A' \cap B' \]
\[ (A \cap B)' = A' \cup B' \]

Distributive Law:

\[ A \cup (B \cap C) = (A \cup B) \cap (A \cup C) \]
\[ A \cap (B \cup C) = (A \cap B) \cup (A \cap C) \]