



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:

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$