

Experiment – any activity whose outcome is uncertain

Examples:

1. Randomly picking student to answer question
2. Outcome of basketball game

Basic outcome – the particular result of the experiment

Event – a collection of basic outcomes that share one or more characteristics

Sample Space - identifies all possible outcomes that of an experiment

Basic Probability Rules:

1. Probability is between zero and one
2. Probability of an event is the sum of the probabilities of its basic outcomes

Consider Event $A = \{O_1, O_2, O_3\}$

Probability of Event A: $P(A) = P(O_1) + P(O_2) + P(O_3)$

Methods of assigning probability

1. **Theoretical (equally likely) Approach**

Probability of event A derived from assumption that all basic outcomes are equally likely

2. **Relative Frequency Approach**

Observe the relative frequency of events from repeated trials of experiment

$$P(A) = \frac{\text{Number of Times Event A Occurs}}{\text{Number of Trials of Experiment}}$$

Which method was used to derive probability?

1. Probability Lakers beat the Golden State Warriors is 35%
2. Probability coin winds up heads is 50%
3. Probability coin winds up heads is 45%
4. Probability a student will pass a particular course is 85%
5. A class has an equal number of female students and those who are not female. The probability the teacher selects a female to answer a question is 60%
6. The probability of being dealt an ace from a full deck of cards is $\frac{4}{52}$

Union and Intersection

$A \cup B$ **union** of events A and B

Consists of basic outcomes that fall into one or both events

$A \cap B$ **intersection** of events A and B

Consists of outcomes that fall into both events A and B

Complement

Event $\bar{A}$, the complement of A, consists of the basic outcomes of an experiment that fall outside of event A

Mutually Exclusive events do not share basic outcomes; their intersection would be an empty set; for example $P(A \cap \bar{A}) = 0$.