



Study of probability theory and probability models for dice game of craps

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Introduction : Probability is the language of uncertainty.

Using statistics, we can better predict the outcomes of random phenomena over the long term – from the very

complex, like weather, to the very simple, like a coin flip, or of more interest to gamblers, a dice toss. A probability is a numerical value assigned to a given event A . The probability of an event is written $P(A)$, and describes the long-run relative frequency of the event. The first two basic rules of probability are the following:

Rule 1: Any probability $P(A)$ is a number between 0 and 1 ($0 \leq P(A) \leq 1$).

Rule 2: The probability of the sample space S is equal to 1 ($P(S) = 1$).

The sample space S for a probability model is the set of all possible outcomes. An event A is a subset of the sample space S .

Disjoint. : If two events have no outcomes in common, then they are called *disjoint*. For example, the possible outcomes of picking a single marble are disjoint: only one color is possible on each pick. The addition of probabilities for disjoint events is the third basic rule of probability:

Rule 3: If two events A and B are disjoint, then the probability of either event is the sum of the probabilities of the two events: $P(A \text{ or } B) = P(A) + P(B)$.

Union The chance of *any* (one or more) of two or more events occurring is called the union of the events. The probability of the union of disjoint events is the sum of their individual probabilities.

Rule 4: The probability that any event A does not occur is $P(A^c) = 1 - P(A)$.

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