Chapter 5

Complement of an event A^C Refers to the event "not A".

Complement rule The probability that an event does not occur is 1 minus the probability that the event does occur. In symbols, $P(A^C) = 1 - P(A)$.

Conditional probability The probability that one event happens given that another event is already known to have happened. Suppose we know that event A has happened. Then the probability that event B happens given that event A has happened is denoted by $P(B \mid A)$.

Conditional probability formula To find the conditional probability $P(B \mid A)$, use the formula $P(B \mid A) = \dfrac{P(A \cap B)}{P(A)}$.

Event Any collection of outcomes from some chance process. That is, an event is a subset of the sample space. Events are usually designated by capital letters, like A, B, C, and so on.

General addition rule If A and B are any two events resulting from some chance process, then the probability that event A or event B (or both) occur is $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

General multiplication rule The probability that events A and B both occur can be found using the formula $P(A \cap B) = P(A) \cdot P(B \mid A)$ where $P(B \mid A)$ is the conditional probability that event B occurs given that event A has already occurred.

Independent events Two events are independent if the occurrence of one event has no effect on the chance that the other event will happen. In other words, events A and B are independent if $P(A \mid B) = P(A)$ and $P(B \mid A) = P(B)$.

Intersection The intersection of events A and B, denoted by $A \cap B$, refers to the situation when both events occur at the same time.

Law of Large Numbers If we observe more and more repetitions of any chance process, the proportion of times that a specific outcome occurs approaches a single value., which we call the probability of that outcome**.**

Multiplication rule for independent events If A and B are independent events, then the probability that A and B both occur is $P(A \cap B) = P(A) \cdot P(B)$.

Mutually exclusive (disjoint) Two events are mutually exclusive (disjoint) if they have no outcomes in common and so can never occur together.

Probability The probability of any outcome of a chance process is a number between 0 and 1 that describes the proportion of times the outcome would occur in a very long series of repetitions.

Probability model A description of some chance process that consists of two parts: a sample space S and a probability for each outcome.

Sample space *S* The set of all possible outcomes of a chance process.

Simulation The imitation of chance behavior, based on a model that accurately reflects the situation.

Tree diagram Used to display the sample space for a chance process that involves a sequence of outcomes.

Two-way tables and Venn diagrams Used to display the sample space for a chance process. Two-way tables and Venn diagrams can also be used to find probabilities involving events A and B.

Union The union of events A and B, denoted by $A \cup B$, consists of all outcomes in A, or B, or both.