

# Glossary

## Advanced Data Analytics

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## Terms and definitions from Course 4

### A

**A/B testing:** A way to compare two versions of something to find out which version performs better

**Addition rule (for mutually exclusive events):** The concept that if the events A and B are mutually exclusive, then the probability of A or B happening is the sum of the probabilities of A and B

### B

**Bayes' rule:** (Refer to **Bayes' theorem**)

**Bayes' theorem:** A math formula for stating that for any two events A and B, the probability of A given B equals the probability of A multiplied by the probability of B given A divided by the probability of B; also referred to as Bayes' rule

**Bayesian inference:** (Refer to **Bayesian statistics**)

**Bayesian statistics:** A powerful method for analyzing and interpreting data in modern data analytics; also referred to as Bayesian inference

**Binomial distribution:** A discrete distribution that models the probability of events with only two possible outcomes: success or failure

### C

**Central Limit Theorem:** The idea that the sampling distribution of the mean approaches a normal distribution as the sample size increases

**Classical probability:** A type of probability based on formal reasoning about events with equally likely outcomes

**Cluster random sample:** A probability sampling method that divides a population into clusters, randomly selects certain clusters, and includes all members from the chosen clusters in the sample

**Complement of an event:** In statistics, refers to an event not occurring

**Complement rule:** A concept stating that the probability that event A does not occur is one minus the probability of A

**Conditional probability:** The probability of an event occurring given that another event has already occurred

**Confidence interval:** A range of values that describes the uncertainty surrounding an estimate

**Confidence level:** A measure that expresses the uncertainty of the estimation process

**Continuous random variable:** A variable that takes all the possible values in some range of numbers

**Convenience sample:** A non-probability sampling method that involves choosing members of a population that are easy to contact or reach

## D

**Dependent events:** The concept that two events are dependent if one event changes the probability of the other event

**Descriptive statistics:** A type of statistics that summarizes the main features of a dataset

**Discrete random variable:** A variable that has a countable number of possible values

## E

**Econometrics:** A branch of economics that uses statistics to analyze economic problems

**Empirical probability:** A type of probability based on experimental or historical data

**Empirical rule:** A concept stating that the values on a normal curve are distributed in a regular pattern, based on their distance from the mean

## F

**False positive:** A test result that indicates something is present when it really is not

## I

**Independent events:** The concept that two events are independent if the occurrence of one event does not change the probability of the other event

**Inferential statistics:** A type of statistics that uses sample data to draw conclusions about a larger population

**Interquartile range:** The distance between the first quartile (Q1) and the third quartile (Q3)

**Interval:** A sample statistic plus or minus the margin of error

**Interval estimate:** A calculation that uses a range of values to estimate a population parameter

## L

**Literacy rate:** The percentage of the population in a given age group that can read and write

**Lower limit:** When constructing an interval, the calculation of the sample means minus the margin of error

## M

**Margin of error:** The maximum expected difference between a population parameter and a sample estimate

**Mean:** The average value in a dataset

**Measure of central tendency:** A value that represents the center of a dataset

**Measure of dispersion:** A value that represents the spread of a dataset, or the amount of variation in data points

**Measure of position:** A method by which the position of a value in relation to other values in a dataset is determined

**Median:** The middle value in a dataset

**Method:** A function that defines and performs behaviors like computation

**Mode:** The most frequently occurring value in a dataset

**Multiplication rule (for independent events):** The concept that if the events A and B are independent, then the probability of both A and B happening is the probability of A multiplied by the probability of B

**Mutually exclusive:** The concept that two events are mutually exclusive if they cannot occur at the same time

## N

**Non-probability sampling:** A sampling method that is based on convenience or the personal preferences of the researcher, rather than random selection

**Nonresponse bias:** When certain groups of people are less likely to provide responses

**Normal distribution:** A continuous probability distribution that is symmetrical on both sides of the mean and bell-shaped

## O

**Objective probability:** A type of probability based on statistics, experiments, and mathematical measurements

## P

**Parameter:** A characteristic of a population

**Percentile:** The value below which a percentage of data falls

**Point estimate:** A calculation that uses a single value to estimate a population parameter

**Poisson distribution:** A probability distribution that models the probability that a certain number of events will occur during a specific time period

**Population:** Every possible element that a data professional is interested in measuring

**Population proportion:** The percentage of individuals or elements in a population that share a certain characteristic

**Posterior probability:** The updated probability of an event based on new data

**Prior probability:** The probability of an event before new data is collected

**Probability:** The branch of mathematics that deals with measuring and quantifying uncertainty

**Probability distribution:** A function that describes the likelihood of the possible outcomes of a random event

**Probability sampling:** A sampling method that uses random selection to generate a sample

**Purposive sample:** A method of non-probability sampling that involves researchers selecting participants based on the purpose of their study

## Q

**Quartile:** A value that divides a dataset into four equal parts

## R

**Random experiment:** A process whose outcome cannot be predicted with certainty

**Random seed:** A starting point for generating random numbers

**Random variable:** A variable that represents the values for the possible outcomes of a random event

**Range:** The difference between the largest and smallest value in a dataset

**Representative sample:** A sample that accurately reflects the characteristics of a population

## S

**Sample:** A subset of a population

**Sample size:** The number of individuals or items chosen for a study or experiment

**Sample space:** The set of all possible values for a random variable

**Sampling:** The process of selecting a subset of data from a population

**Sampling bias:** When a sample is not representative of the population as a whole

**Sampling distribution:** A probability distribution of a sample statistic

**Sampling frame:** A list of all the items in a target population

**Sampling variability:** How much an estimate varies between samples

**Sampling with replacement:** When a population element can be selected more than one time

**Sampling without replacement:** When a population element can be selected only one time

**Simple random sample:** A probability sampling method in which every member of a population is selected randomly and has an equal chance of being chosen

**Snowball sample:** A method of non-probability sampling that involves researchers recruiting initial participants to be in a study and then asking them to recruit other people to participate in the study

**Standard deviation:** A statistic that calculates the typical distance of a data point from the mean of a dataset

**Standard error:** The standard deviation of a sample statistic

**Standard error of the mean:** The sample standard deviation divided by the square root of the sample size

**Standard error of the proportion:** The square root of the sample proportion times one minus the sample proportion divided by the sample size

**Standardization:** The process of putting different variables on the same scale

**Statistic:** A characteristic of a sample

**Statistical significance:** The claim that the results of a test or experiment are not explainable by chance alone

**Statistics:** The study of the collection, analysis, and interpretation of data

**Stratified random sample:** A probability sampling method that divides a population into groups and randomly selects some members from each group to be in the sample

**Subjective probability:** A type of probability based on personal feelings, experience, or judgment

**Summary statistics:** A method that summarizes data using a single number

**Systematic random sample:** A probability sampling method that puts every member of a population into an ordered sequence, chooses a random starting point in the sequence, and selects members for the sample at regular intervals

## T

**Target population:** The complete set of elements that someone is interested in knowing more about

## U

**Undercoverage bias:** When some members of a population are inadequately represented in a sample

**Upper limit:** When constructing an interval, the calculation of the sample means plus the margin of error

## V

**Variance:** The average of the squared difference of each data point from the mean

**Voluntary response sample:** A method of non-probability sampling that consists of members of a population who volunteer to participate in a study

## Z

**Z-score:** A measure of how many standard deviations below or above the population mean a data point is