

Fundamental Concepts in Applied Statistics

What is the difference between a statistic and a parameter?

Be able to identify settings as involving means or proportions, one-sample or two.

What is the sampling distribution of a statistic?

What does it mean for an estimator to be unbiased?

What is the meaning of the terms standard error and margin of error of an estimator?

How do we interpret a confidence interval?

What happens to the interval as the confidence level or the sample size increases?

What are the respective roles of the null and alternative hypotheses in a test?

What are type I and type II errors in a test of hypothesis?

What is the p-value of a test and how is it interpreted?

How do we graphically check whether a data set is drawn from a normal distribution?

What is the criterion for fitting a regression equation? How are the results of the fit of a simple regression model interpreted?

How is an individual slope in a fitted multiple regression model interpreted?

How do we interpret R-squared in a regression context?

What is the difference in the objective when estimating the mean response at a particular x-value versus predicting a response at that x-value?

What is multicollinearity and how does it affect inference in a regression problem?

What is the purpose of blocking in an experimental setting?

What are the advantages of replication in an experiment?

What are the advantages of randomization of treatments to experimental units?

Why are placebos used in medical experiments?

What does correlation measure?

How are correlation and causation related?

What is the nature and purpose of ANOVA?