Understand the basics of hypothesis testing, including size/significance level, p-values, rejection regions, type I and II errors, and power.

Understand most powerful tests and uniformly most powerful tests and know when they can be found and how to find them. Understand likelihood ratio tests and generalized likelihood ratio tests. Understand how to compute the MLE under the null and under the union of the null and alternative. Know how to get an approximate p-value for a generalized likelihood ratio test.

Understand goodness of fit tests, including the general form of the test statistic, the distribution including degrees of freedom under the null. Know what to do when there is an unknown parameter associated with the null distribution.

Understand the sign test and the paired sign test, including when they are appropriate. Be able to write an expression for the exact p-value.

Understand the Wilcoxon rank-sum test, and be able to write an exact expression for the p-value, even for a two-sided alternative. Know the assumptions made for computing the p-value. Know when to use this test.

Understand the basics of confidence intervals, including pivotal quantities, confidence level, random intervals, one-sided confidence intervals, and equal-tailed confidence intervals. You should be able to identify a pivotal quantity for a location or scale parameter. You should also be able to identify a pivotal quantity for the standard deviation of a normal population or the ratio of two standard deviations from two independent normal populations.

Understand how to create approximate confidence intervals or do approximate tests using an asymptotic distribution. In particular, understand how to do this for a proportion using Slutsky’s Theorem to avoid a solving a really nasty inequality.

You should know the density function of an exponential distribution. You should know what function of the sample mean (of an exponential distribution) would give you a chi-squared distribution.

You should know the mass function for a Poisson distribution.

You should know the density function of a two-parameter exponential.

You should know what a scale parameter is.

You should know what a location parameter is.