

MTH 452 Study Guide for the Final Exam

1. Everything in the study guide for exam 1.
2. You should know how Bayesian estimation works in the simple case of estimating a binomial parameter using beta densities as prior distributions.
3. You should be able to determine confidence intervals for the mean of a normal population with the variance known and unknown, the difference of two normal populations with different but known variances, the variance of a normal population, and the value of a binomial parameter using a normal approximation.
4. You should be able to give the *definitions* of the following terms:
 - a) simple hypothesis, composite hypothesis, type I error, type II error, size (significance level) of a test, critical region, power of test, power function of a test, most powerful test, p-value of test.
 - b) covariance, correlation coefficient, regression function in general
5. You should be able to explain the Neyman-Pearson framework for hypothesis tests and to state the Neyman-Pearson lemma as in the text or as discussed in class. You should be able to use the N-P lemma to derive best tests for testing one simple hypothesis against another in situations involving the normal, exponential, binomial, or Poisson distributions including the distribution of the test statistic under the null hypothesis.
6. You should be able to derive the likelihood ratio test of a simple null hypothesis against a composite alternative and simple equivalent tests from it.
7. You should be able to devise one-sided and two-sided tests of a normal mean with variance known or unknown, determine the critical region for a given size and/or determine a p-value. You should be able to devise a test about the value of a normal variance using a χ^2 statistic. You should be able to test a hypothesis about a binomial parameter using a normal (CLT) approximation. (Tables will be provided.)
8. You should know the (linear) regression function for a bivariate normal

and how to estimate the regression equation

9. You should know how the method of least squares is related to normal regression analysis and how to estimate the regression coefficients α, β, σ .