Midterm review list - 170S - Winter 2019

All covered material from chapters 6 and 7 can appear in the midterm. All necessary distribution tables will be given. Any non-standard density function and relevant expectation/variance will be given too. (Standard distributions: uniform, Bernoulli, binomial, normal (=gaussian).) 

You are allowed to bring one sheet (at most letter size sheet) with the formulas to the midterm.

Dont forget your ID, pencil and eraser. :-) Additional draft paper will be provided by us.

Some of the key definitions and ideas that you are expected to know:

7.1, 7.2, 7.3 definitions: one and two-sided confidence interval with confidence coefficient x% (for an estimate hat(theta) of a parameter theta); confidence of a given interval

how to: how to compute formulas for the confidence intervals for means, proportions, or based on definition; how to compare two sets of samples using confidence intervals

6.8 definitions: prior, posterior distributions, MAP estimator

how to: use Bayes formulas in the discrete and continuous cases; how to find and interpret posterior distribution and MAP estimates

6.7 definitions: sufficient statistics, densities in the exponential arm

how to: use properties of sufficient statistics, find sufficient statistics from factorization theorem and using exponential form; check that a density have exponential form

6.5 definitions: simple linear regression problem (and its formula), residuals

how to: find MLE for the coefficients of linear regression

6.4 definitions: maximum likelihood function and estimate; empirical moments; method of moments estimate; biased and unbiased estimators

how to: find maximum likelihood and method of moment estimators, how to check if an estimate is (un)biased

6.2, 6.3 definitions: order statistics, median, quantiles, quartiles, percentiles, sample quantiles (and formula for them), quantile-quantile plot, box plot, interquartile range

how to: find the quantities and draw the plots mentioned above from given samples; how to find \( P(X_i < 5) \) given density function

6.1 histograms and how to plot them, sample mean and sample standard deviation

5.5 (Only to the extent necessary for the chapter 6 and 7 material)

concepts: statements of the theorems 5.5-1, corollary 5.5-1, 5.5-2 and 5.5-3 and how to use them (for example, to find confidence intervals)

- Chi-square distribution as a distribution of the square of gaussian, distribution of the sum of two independent chi-square distributed random variables (without proofs). Properties of the normal distribution, central limit theorem, properties of expectations and variances. See also 170E review list in Homework 1.

This is a potentially incomplete list, in particular, it will be updated with the chapter 7 material on Friday evening.