

STA 200B Homework 1

Due: Wednesday, Jan. 15

HW will not be collected but there will be a quiz on the due date

Reading Assignment:

Probability Review: 3.1-3.9, 4.1-4.7, 5.1-5.8

Current Lectures: 7.1, 7.5, 7.6

(all section numbers and problems refer to the textbook listed in the syllabus)

Problems:

Section 3.7: 3, 8

Section 3.8: 7

Section 3.9: 6, 14

Section 3.11: 16

Section 4.4: 10

Section 4.6: 8

The quiz will cover the following problems:

Section 7.1: 3,6

Section 7.5: 2,3,9,11,12,13

Section 7.10: 5

Additional problem: Show that for a random sample X_1, \dots, X_n it holds that

(i) $\min_a \sum_{i=1}^n (X_i - a)^2 = \sum_{i=1}^n (x_i - \bar{X})^2$,

(ii) $\sum_{i=1}^n (X_i - \bar{X})^2 = \sum_{i=1}^n X_i^2 - n\bar{X}^2$.

(iii) $\sum_{i=1}^n (X_i - \bar{X})^2 = \frac{1}{2n} \sum_{i,j=1}^n (X_i - X_j)^2$.

If the population from which the random sample is drawn has mean μ and variance σ^2 , then furthermore

(iv) $E(\bar{X}) = \mu$, $\text{var}(\bar{X}) = \frac{\sigma^2}{n}$.

(v) The moment generating function (m.g.f.) of \bar{X} is $\psi(t) = [\psi_0(t/n)]^n$, where $\psi_0(t) = E(e^{tX})$ is the m.g.f. of X .