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Math 583    HW 2 Fall 2020        Due Friday, Sept. 4.
BRING A SHEET OF NOTES AND CALCULATOR TO EVERY QUIZ.
Quiz 2 on Wednesday will have problems like Problems 2.14 and 2.21.
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Know how to find SE($\overline{Y}$), SE(MED(n)), and SE(T_n) where T_n is the 25% trimmed mean.

R is described in more detail in Section 11.2.

2.14. Consider the data set 6, 3, 8, 5, and 2. Show work.

a) Referring to Application 2.4, find L_n, U_n, p and SE(MED(n)).

b) Referring to Application 2.5, let T_n be the 25% trimmed mean. Find L_n, U_n, p, T_n and SE(T_n).

11.2ab Verify the formula for MED(Y) for the following distributions.
a) Exponential (λ).
b) Lognormal (μ, σ^2). (Hint: $\Phi(0) = 0.5$.)

11.3 ab Verify the formula (from Table 2.2 or ch. 11) for MAD(Y) for the following distributions. (Hint: Some of the formulas may need to be verified numerically. Find the cdf in the appropriate section of Chapter 11. Then find the population median MED(Y) $= M$. The following trick can be used except for part c). If the distribution is symmetric, find $U = y_{0.75}$. Then $D = \text{MAD}(Y) = U - M$.)
a) Cauchy (μ, σ).
b) Double exponential (θ, λ).

The easy way to do this problem is to find the cdf in the appropriate section of Chapter 11. Then find the population median MED(Y) $= M$. Then find $U = y_{0.75}$. Then since these distributions are symmetric, $D = \text{MAD}(Y) = U - M$.

2.37 a, b i) and ii) a) (Download the *R* function `rcisim`) to reproduce Tables 2.6 and 2.7. Two lines need to be changed with each CI. One line is the output line that calls the CI and the other line is the parameter estimated for exponential(1) data. The default is for the classical interval. Thus the program calls the function *cci* used in Problem 2.28.

b) Copy and paste the *R* commands for this problem, obtain the output, and explain what the output shows.
i) rcisim(n,type=1) for n = 10, 50, 100
ii) rcisim(n,type=2) for n = 10, 50, 100

2.16. Find shorth(5) for the following data set. Show work.

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6   76   90   90   94   94   95   97   97   1008
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2.21. Suppose you are estimating the mean μ of losses with $T = \overline{X}$.
actual losses 1, 2, 5, 10, 50: $\overline{X} = 13.6$,
a) Compute $T_1^*, ..., T_4^*$, where T_i^* is the sample mean of the ith sample.
samples:

2, 10, 1, 2, 2:

50, 10, 50, 2, 2:

10, 50, 2, 1, 1:

5, 2, 5, 1, 50:

b) Now compute the bagging estimator which is the sample mean of the T_i^*: the bagging estimator $\overline{T}^* = \frac{1}{B} \sum_{i=1}^{B} T_i^*$ where $B = 4$ is the number of samples.