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Week 8 PS

1. An equal number for all as it is a random sample.
2. a. True, the middle of a CLT/null distribution CI is the point estimate.
   b. False, it is the median of a difference in means.
   c. False, the bootstrap makes no assumptions about the distribution/initial mean of data.
   d. False, but if it is due to random variation, you will get a false positive.
   e. False, you use the empirical distribution of the data instead
   f. True, the sample is generated using inverse CDF and thus only requires the parameter of interest to start.
   g. False, the NHST can not estimate the median
   h. True, because lower p-values are also less likely.
   i. False, can be from any distribution.
   j. True.

3. 90% confidence interval = (.37-.81). I got this by generating 20 random samples from the exponential distribution in excel 20 times with lamba = .5, and getting the lambda from each of these samples after finding the mean of the whole sample. I then sorted all 20 of these lambdas and found the 95th and 5th percentile, leaving me with a 90% confidence interval.

4. 90% confidence interval = (-4.6-13) Assuming the sample is random and representative, I am 90% confident voters approve of my candidate -4.6% to 13% more.

5. The sample is random and representative.

6. Pros of bootstrap: You aren't making arguments about the null distribution, X doesn't have to be independent, can create confidence intervals for any statistic.

Cons of bootstrap: X has to be random sample, still can't say anything about the Ha distribution directly, Var(X) has to = Var(Population).

Pros of NHST: Tells us how likely we are to see a result given null is true, popularly used in statistics, need few data points (SD, N, mean).

Cons of NHST: X has to be random and iid, only works for sum quantities, have to interpret with respect to the null distribution. Interpretation of p-value can be easily misunderstood.

7. When you want to get a confidence interval for the parameter of a distribution.

8. Bootstrap: Assuming the sample is random and representative am 95% confident that the means differ by 1-6 units.

NHST: I am 95% confident the true mean difference between the groups is in (2,5).

9. When we want to conduct a permutation test for the assumption that both samples come from the same distribution.

10. The lowest p-value is 0.01.