

NAME:

Statistics 111 Summer Session II

### **Homework Five**

You are allowed to discuss problems with other students, but the final answers must be your own work.

For all problems that require calculation, YOU MUST ATTACH SEPARATE PAGES, NEATLY WRITTEN, THAT SHOW YOUR WORK.

Please mark your answer in the space provided. As a general rule, each blank counts for one point unless otherwise specified. If necessary work is not shown, or if that work is substantially wrong, then you will not get credit even if the answer is correct. (The obvious purpose of this is to prevent students from mindlessly copying each other's answers.)

Report all numerical answers to at least two correct decimal places.

**DUE DATE: START of class on Friday, July 27, 2018.**

1. **(Normal, Known Variance)** Let 0.37, 0.40, -0.16, -1.43, 0.61, -0.80, -0.50, 0.24, 0.01, 0.87 be an *i.i.d.* sample from  $\text{Normal}(\mu, 1)$ . Find a 90%, 95% and 99% confidence interval for  $\mu$ . (3 points)

2. (***t* distribution**) In the June 1986 issue of *Consumer Report*, some data on the calorie content of beef hot dogs is given. Here are the numbers of calories in 20 different hot dog brands.

186 181 176 149 184 190 158 139 175 148  
152 111 141 153 190 157 131 149 135 132

Assume that these numbers are the observed values from a random sample of twenty independent normal random variables with mean  $\mu$  and variance  $\sigma^2$ , both unknown. Find a 90% confidence interval for the mean number of calories  $\mu$ . Also interpret the confidence interval in the context of the study. (3 points)

3. (**Approximate Intervals**) According to this blog post:

When asked, “Do you ever regret getting a tattoo?” 14 percent of respondents said yes according to a 2012 poll by Harris Interactive, a market research firm. [...] Harris interviewed 2,016 adults, of which 21 percent said they had a tattoo. So that claim about regrets is only based on 423 people.

Using this data, find an approximate 95% confidence interval for the percentage of people who regret getting a tattoo, and interpret the confidence interval in the context. (3 points)

4. (**Two Groups**) In 2007, a paper called Deception in Dating was released. The paper included a study of 40 men and 40 women who were using online dating websites. One outcome is "reported age – actual age". For men, the sample mean difference is  $-0.51$  years with a standard deviation of 1.61 years. For women, the sample mean difference is  $-0.37$  years with a standard deviation of 1.96 years. Assuming that the outcome is Normal,

(a) Find a 95% confidence interval for the difference in "reported age – actual age" between men and women, assuming the population variance of the outcome in men and women is the same. (2 points)

(b) Find a 95% confidence interval for the difference in "reported age – actual age" between men and women, assuming the population variances of the outcome in men and women are different and using the approximation. Compare the results with (a). (2 points)

- (c) Assuming we observe that 60.5% of the men and 59% of the women in the sample lied about their age. Find a 95% confidence interval for the proportion difference between men and women. (2 points)

I know the class moves fast and that's expected for most summer classes, which is why I always ask for feedback so I can know how to help you. That said, how hard was it for you and how many hours did it take you to finish it? Any other suggestions, comments, concerns about the class?

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