Confidence Interval for Mean

1. A random sample of 36 measurements was selected from a population with unknown mean μ. The sample mean is $\bar{x} = 12$ and the sample standard deviation is $s = 18$. Calculate an approximate 95% confidence interval for μ. Use the approximation $t_{\alpha/2, n-1} = t_{0.025, 35} \approx 2$.

2. Complete Problem 1, with a 99% confidence interval instead of a 95% confidence interval.

3. Complete Problem 1, with an 80% confidence interval instead of a 95% confidence interval.

4. How reliable is the SoHo Halal Guy's Yelp rating? The SoHo Halal Guy at Broadway and Houston (`http://www.yelp.com/biz/soho-halal-guy-new-york`) currently has 47 Yelp reviews (4 1-star; 1 2-star; 6 3-star; 16 4-star; and 20 5-star). The average star rating is 4.0 and the sample standard deviation of the star ratings is 1.2. How much should we trust the number "4.0"? We will use a confidence interval to quantify the uncertainty associated with this number.

(a) What is a reasonable population to associate with this sample?

(b) What is the meaning of the population mean, μ?

(c) Find a 95% confidence interval for the population mean, μ.

(d) Under what conditions is the confidence interval valid?

5. La Colombe at Lafayette and 4th St (`http://www.yelp.com/biz/la-colombe-new-york-2/`) currently has 559 Yelp reviews (11 1-star; 19 2-star; 41 3-star; 172 4-star; and 316 5-star). The average star rating is 4.36 and the sample standard deviation of the star ratings is 0.91. Find a 95% confidence interval for the expected rating of a random La Colombe Yelp reviewer.

Confidence Interval for Proportion

6. A CNN/ORC post-debate poll surveyed 547 voters who watched the third presidential debate on October 19, 2016. The results are at `http://www.cnn.com/2016/10/19/politics/hillary-clinton-wins-third-presidential-debate-according-to-cnn-orc-poll`. Of the respondents, 52% thought that Clinton did the best job, while 39% thought that Trump did.

   (a) What is a reasonable population to associate with this sample?

   (b) There are a few population parameters of interest. Choose one.

   (c) Find a 95% confidence interval for the population parameter.

   (d) Under what conditions is the confidence interval valid?

7. Use the following data from the class survey to estimate the relevant population proportions. Give 95% confidence intervals for these proportions.

   (a) Gender: 17 Female, 30 Male.

   (b) Drinks at least one cup of coffee on a typical day: 37 Yes, 10 No.

   (c) Political affiliation: 36 Democrat, 6 Republican, 5 Other. (For this problem there are three different choices for the population parameter; choose one of them.)

8. In Problem 7, what are the relevant populations?

9. In Problem 7, what assumptions do we need for the confidence intervals to be valid?