Homework 9 **Name:** _____

Elementary Statistics & Inference (STAT:1020; Bognar)

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1. The longevity of truck tires (in months) has a normal distribution with mean μ months and standard deviation $\sigma = 8.0$ months. Suppose $n = 16$ tires are randomly selected and the sample mean longevity $\bar{x} = 42.5$ months.

   (a) Find a 90% CI for the mean longevity μ.

   (b) Based upon your answer in (1a), does the mean longevity μ significantly differ from 55 months? Why?

   (c) How many tires would be needed for $se(\bar{x})$ to equal 1.0?

   (d) Even though the sample size $n < 30$, we were able to find the CI in (1a). Why?

2. The diastolic blood pressure, X, of smokers follows a normal distribution with mean μ and standard deviation $\sigma = 15$, i.e. $X \sim N(\mu, \sigma = 15)$. The diastolic blood pressure of 3 randomly selected smokers was:

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   125  140  125
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   (a) Find a 95% CI for the population mean diastolic blood pressure μ.

   (b) Interpret the CI in part (2a).

(c) Based upon your answer in (2a), does the population mean diastolic blood pressure μ significantly differ from 100? Why?

3. In the Iowa Driving Simulator, the number of times the center line is crossed by individuals that are under the influence of alcohol has a distribution that is skewed to the right with mean μ and standard deviation $\sigma = 7$. For the 49 participants that drove after drinking alcohol, the mean number of times the center line was crossed was $\bar{x} = 10$.

(a) Find an approximate 95% confidence interval for μ.

(b) Interpret the CI in (3a).

(c) What is the margin of error at (95% confidence)?

(d) How many drivers would be needed for the margin of error (at 95% confidence) to equal 0.686?

(e) Could we find the CI in (3a) if the sample size $n < 30$? Explain.

4. The gain of a certain type of MOSFET transistor follows a normal distribution with mean μ and standard deviation $\sigma = 11$. An electrical engineer randomly selected 16 transistors, and determined a CI for μ to be $(71.5, 81.5)$.

   (a) What percent confidence interval is this?

   (b) How large of a sample size n would be required for the margin of error to equal 2 at 95% confidence? *Round your answer up to the next whole number.*