Homework 11 **Name:** _____

Prob. and Stat. for Eng. (STAT:2020; Bognar)

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1. Textbook 1.14

   (a)

   (b)

2. Textbook 1.18

   (a)

   (b)

3. Textbook 9.2 ($\sigma = 40$)

4. Textbook 9.3 ($\sigma = 0.0015$)

5. The load strength, X (in pounds), of 18 gauge steel wire can be modeled by a normal distribution with mean μ and standard deviation $\sigma = 15$, i.e. $X \sim N(\mu, \sigma = 15)$. The load strength of 3 randomly selected pieces of wire was:

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125  140  125
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   (a) Find a 95% CI for the population mean load strength μ.

   (b) Interpret the CI in part (5a).

   (c) Based upon your answer in (5a), does the population mean load strength μ significantly differ from 100 pounds? Why?

6. 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 (6a).

(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 (6a) if the sample size $n < 30$? Explain.

7. 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.*