**Module 3 Homework Assignment**

1. Find the critical value corresponding to a sample size of 19 and a confidence level of 99%.

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| **Solution:** | Instructor Comments: |

2.Find the critical value corresponding to a sample size of 19 and a confidence level of 99%.

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| **Solution:** | Instructor Comments: |

3. Explain how the degrees of freedom affect a Chi-Square Distribution.

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| **Solution:** | **Instructor Comments:** |

4. Using a data set of 40 LDL cholesterol levels of women, we get a 95% confidence interval estimate: 916.591 < *σ*2 < 2252.119, and the units of measurement are (mg/dL)2. Identify the corresponding confidence interval of *σ* and include appropriate units. Round to one decimal place. Write a statement that correctly interprets the confidence interval estimate of *σ*.

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| **Solution:** | **Instructor Comments:** |

5. Even if you know the values of S and E, explain why the confidence interval for a population variance cannot be written in the form .

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| **Solution:** | **Instructor Comments:** |

6. A container of car antifreeze is supposed to hold 3785 mL of the liquid. Realizing that fluctuations are inevitable, the quality control manager of Taconic Chemical Company wants to be quite sure that the standard deviation is less than 30 mL. Otherwise, some containers would overflow while others would not have enough of the coolant. She selects a simple random sample of 24 containers and finds that the mean is 3789 mL and the standard deviation is 42.8 mL. Use these sample results to construct the 99% confidence interval for the true value of *σ*. Does this confidence interval suggest that the variation is an acceptable level?

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| **Solution:** | **Instructor Comments:** |

7. The values listed below are the waiting times (in minutes) of customers at the Jefferson Valley Bank, where customers enter a single waiting line that feeds three teller windows. Construct a 95% confidence interval for the population standard deviation and interpret the results.

6.5 6.6 6.7 6.8 7.1 7.3 7.4 7.7 7.7 7.7

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| **Solution:** | **Instructor Comments:** |

8. The values listed below are the waiting times (in minutes) of customers at the Bank of Providence, where customers enter any one of three different lines that have formed at three teller windows. Construct a 95% confidence interval for the population standard deviation  and interpret the results.

4.2 5.4 5.8 6.2 6.7 7.7 8.5 9.3 10.0

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| **Solution:** | **Instructor Comments:** |

9. Comparing the results from problems 7 and 8, do the confidence intervals suggest a difference in the variation among waiting times? Which arrangement seems better: the single-line or multiple-line?

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| **Solution:** | **Instructor Comments:** |

10. You want to estimate *σ* for the population of waiting times at a fast-food restaurant’s drive-up windows, and you want to be 95% confident that the sample standard deviation is within 20% of *σ*. Find the minimum sample size needed. Is this sample size practical?

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| **Solution:** | **Instructor Comments:** |