BUS 310, Quiz #1, Spring 2019

Name KEY

Section _____

Instructions: This quiz is to be completed entirely in class. You may not use cell phones, and you may only access internet resources you are specifically directed to use. Go to Blackboard and open the data file posted under Quiz #1. Use it to answer the following questions. **Place your answers to the bolded questions directly on this page.** You must submit the Excel file you used to perform calculations into the Quiz #1 folder in Blackboard, and submit the paper version of the quiz to the instructor to be eligible to receive full credit.

1. A local politician has budgeted at most $80,000 for her media campaign. She plans to distribute these funds between TV ads and radio ads. Each one-minute TV add is expected to be seen by 20,000 viewers, and each one-minute radio ad is expected to be heard by 4000 listeners. Each minute of TV time costs $8000 and each minute of radio time costs $2000. She has been advised to use at most 90% of her media campaign budget on TV ads. If the variables are the number of each type of ad, maximize the number of people she can reach. Formulate and solve a mathematical model for this situation to maximize profit using Solver and produce a sensitivity report. **State the objective function and the number of each ad to be produced and state the maximum number of people reached and the shadow price for the budget constraint.**

   20,000X + 4000Y = People = 198,918 or 196,000

   2.486 more people can see the add for each additional dollar spent (decimal version only)

2. Consider the data set on Sheet #2 of the data set. Use the Data Analysis Tool Pack (or another means) to select a simple random sample of size n=10 from the amount spent on Transportation. Find **the mean amount spent. How does your sample mean compare to the sampling distribution graphed on the Sheet #2-samples? Explain. Find the standard deviation of the sample means. How does it compare to $\frac{s}{\sqrt{n}}$?**

   Answers will vary

   mean = 172.46

   falls in bin 5 just above modal class

   Standard error from sampl. dist = 9.95

   $\frac{s}{\sqrt{10}}$ from sample = 11.46

   Similar/see data = 9.14

3. Data on marathon runners are found on Sheet #3. Find the proportion of marathon runners that are from the United States. Use that information to **calculate a 95% confidence for the true proportion of all long-distance runners. Interpret the meaning of the confidence interval in the context of the problem.**

   p = 82.45%

   (81.70, 83.20)

   We are 95% confident that the true proportion of long distance runners that are americans are between 81.70% and 83.20%.

Submit your completed Excel file to Blackboard, and submit your paper quiz to your instructor in class.