Prince Sultan University

Final Examination, May 23rd , 2017

Stat 101

Term 162

Time Allowed: **180** minutes

Student Name: _____

Student ID #: _____

Teacher's Name: _____Class Time _____

Important Instructions:

1. You may use a scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You may NOT use notes or any textbook.
4. There should be NO talking during the examination.
5. Your exam will be taken immediately if your mobile phone is seen or heard
6. Looking around or making an attempt to cheat will result in your exam being cancelled
7. This examination has 8 problems, some with several parts, and 5 pages (including the front page) Make sure your paper has all these problems.

Problems	Max points	Student's Points
1, 2	10, 4	
3,4	12, 10	
5,6	10, 10	
7,8	14, 10	
Total	**80**	

Q1. 10pts) The reaction time of a driver to visual stimulus is normally distributed with a mean of 0.4 second and a standard deviation of 0.05 second.

    a.   What is the reaction time that is less than 80% of the time? (4pts)

    b.   What is the reaction time that is exceeded 90% of the time? (4pts)

    c.   What is the interquartile range of the reaction times? (3pts)

Q2. 4 pts) A medical statistician wants to estimate the average weight loss of people who are on a new diet plan. In a preliminary study, he guesses that the standard deviation of the population of weight losses is about 10 pounds. How large a sample should he take to estimate the mean loss to within 2 bounds with 98% confidence?

Q3. 12pts) Let X denote the number of bars of service on your cell phone whenever you are at an intersection with the following probabilities:

x	0	1	2	3	4	5
$P(X=x)$	0.1	0.15	0.25	0.25	0.15	0.1

Determine the following probabilities:

a. More than three bars   (2pts)

b. At least one bar (2pts)

c. Find the mean and standard deviation of the number of bars. (5pts)

d. Find the probability of being within two standard units of the mean? (3pts)

Q4. 10pts) Out of ,200 randomly selected flights of the a certain airline company , 150 arrived on time. Let p denote the true proportion of this company's flights that arrive on time.

a. Find a 99% confidence interval for p. (5pts)

b. Suppose that you have no previous data and you have no information about p. You want to estimate p with 99% confidence and a margin of error of 0.05. How many flights should you select? (5pts)

Q5. 10pts) The heights of North American women are normally distributed with a mean of 64 inches and a standard deviation of 2 inches.

      a. What is the probability that a randomly selected woman is taller than 66 inches? (3pts)

      b. A random sample of six women is selected. What is the probability that the sample mean height is greater than 66 inches? (3pts)

      c. For a sample of 25 women. Find the mean height that is smaller than 90% of all the mean heights. (4pts)

Q6. 10pts) In a random sample of 25 computers, the mean repair cost was $ 100 and the standard deviation was $ 43 Assume that the repair cost of computers follow a normal distribution.

    a. Find the 95% confidence interval for the mean repair cost of computers. (6pts)

    b. All other information remaining unchanged, which of the following would produce a narrower interval than the 95% confidence interval constructed? **Explain your answer (4pts)**

        a) Compute a 99% confidence interval rather than a 95% confidence interval.
        b) The sample standard deviation is computed to be 30 instead of 43
        c) The sample size is 10 instead of 25:
        d) The sample size is 35 instead of 25:

Q7. 14 pts) Students scored the following grades on a statistics test: 80, 80, 82, 84, 85, 86, 88, 90, 91, 92, 92, 94, 96, 98, 100, 32. Calculate the and sketch the following.

    a. The interquartile range (IQR) (4pts)

    b. Find the median (3pts)

    c. Are there any outliers? **Explain your Answer** **(4pts)**

    d. Find the 89th percentile. (3 pts)

Q8. 10pts) The probability that a randomly selected person in the population has a certain disease Is 0.05. A blood test is used to test for this disease. If a person has the disease, the probability That the test is positive is 0.9. If a person does not have the disease, the probability that the Test comes negative is 0.96. A random patient goes to see a doctor. The doctor performs the test on him. If the patient tests positive, what is the probability that the patient has the disease