Prince Sultan University
STAT 101
Final Exam
Semester I, Term 161
Sunday, January 22th, 2017

Time Allowed: **120** minutes

Student Name: _____

Student ID #: _____

Teacher's Name: __Section #: _____

Serial #: _____

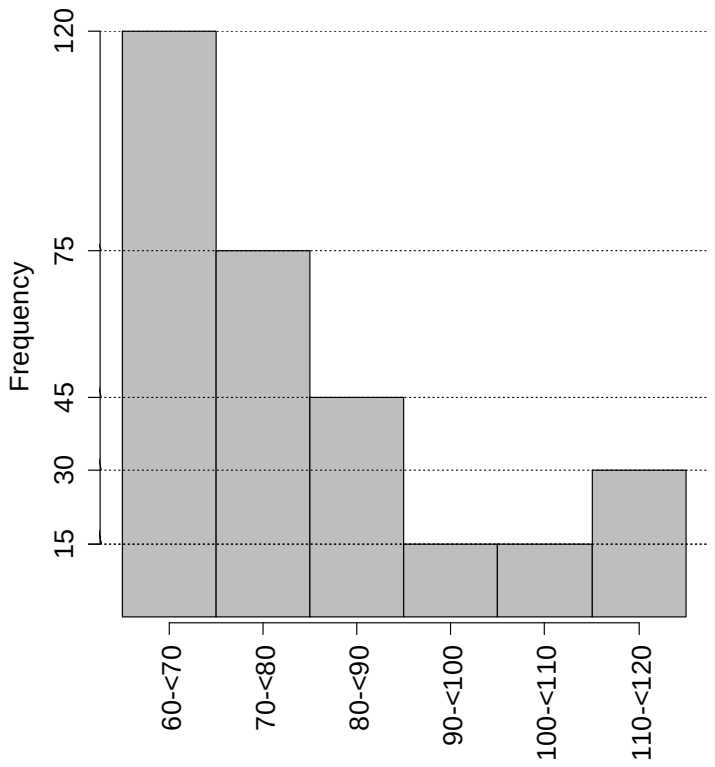
Important Instructions:

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 on 6 pages including the front page, some with several parts. Make sure your paper has all these problems.

Problems	Max points	Student's Points	Total
1	15		
2	15		
3, 4	10, 10		
5,6	4, 10		
7, 8	6, 10		
Total	**80**		

Q1 15 pts) Consider the following histogram

a. Construct a table showing the cumulative relative frequencies **(7 pts)**



b. What percentage of data values are less than 90 **(3 pts)**

c. What class contains the median **Explain your answer (3pts)**

d. Comment on the shape of the distribution **(2pts)**

Q2. 15 pts) A large Corporation gives each of its employees an aptitude test. The scores on the test are normally distributed with a mean of 75 and a standard deviation of 15.

a) 10% of the customers are expected to have a score less than x_0. Find x_0 **(4 pts)**

b) What test score represents the 80th percentile of the distribution of test scores? **(3pts)**

c) An employee will pass the exam if his score is greater than x_1. What should x_1 if we expect 85% of employees to pass. **(4pts)**

d) Find the probability that the sample mean of 16 selected employee is greater than 80 **(4pts)**

Q3. 10 points) A random sample was selected from a population having a normal distribution. Calculate a 90% confidence interval estimate for μ for each of the following situations:

a) $\sum X$ =326, n=18, σ=6.3 **(5 pts)**

b) $\sum X$ =176, , $\sum X^2$ =2664, n=22 **(5pts)**

Q4. 10 pts) A 99% confidence interval was calculated for a population mean, based on a simple random sample of size 27. The population standard deviation was not known. The interval was 60 ± 7.(2 points)

a) What was the sample standard deviation? **(5pts)**

b) Find the 95% confidence interval for the population mean. **(5pts)**

Q5. 4 pts) What **sample size** is needed to estimate a population mean with a margin of error of 2 and a confidence level of 0.90 if the population variance is known to be 226

Q6. 10 pts) A random sample of 140 students from a wide geographic area indicated that 44 students smoke cigarettes.

a) Construct a 98% confidence interval for the true proportion of students smoking cigarettes**. (5pts)**

b) What is the length of the confidence interval in part a)? **(2pts)**

c) Suppose that the population proportion is 0.35. We select a random sample of 80 students What is the probability that the sample proportion is greater than 0.4.**(3pts)**

Q7. 6 pts) The number x of people entering the intensive care unit at a particular hospital on any one day has a Poisson probability distribution with mean equal to 5 persons per day.

a) What is the mean of X? **(1pts)**

b) What is the standard deviation of X? **(1pts)**

c) What is the probability less than 3 persons will enter the intensive care unit at a randomly selected day? **(4pts)**

Q8. 10 pts) An aircraft emergency locator transmitter (ELT) is a device designed to transmit a signal in the case of a crash. Company A makes 60% of the ELTs, Company B makes 25% of the of ELTs and Company C makes the other 15%. Four percent (4 %) of the ELTs made by Company A are defective. Six percent (6%) of the ELTs made by Company B are defective. Eight percent (8%) of the ELTs made by Company C are defective.

a) If an ELT is randomly selected from the general population of all ELTs, find the probability that it was made by the Company C. **(3pts)**

b) If a randomly selected ELT is tested and is found to be defective, find the probability that it was made by Company C**. (7 pts)**