Prince Sultan University
Mathematics Department
STAT 101
Final Exam
Semester II, Term 142
Tuesday May 26, 2015

Time Allowed:**2: 00** <u>minutes</u>

Student Name: _____

Student ID #: _____   Section #:

                                                                                          Time:

Teacher's Name: Dr. Mohammed   Dr. Benson

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 15 problems, some with several parts. Make sure your paper has all these problems.

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

Q1. 15pts) The life of a certain automobile tire is normally distributed with mean 35,000 miles and standard deviation 5,000 miles.

     a. **3pts**) What proportion of such tires last between 30,000 and 40,000 miles?

     b. **2pts**) What proportion of such tires last over 40,000 miles?

     c. **2pts**) What proportion of such tires last exactly 38,000 miles?

     d. **4pts**) What tire life is smaller than 80% of all the tire life?

     e. **4pts**) Find the 95th percentile of all the tire lives.

Q2. 10pts) Of all 3- to 5-year old children, 66% are enrolled in school. If a sample of 500 such children is randomly selected

    a. **3pts**) What is the probability that at least 320 will be enrolled in school?

    b. **4pts**) What is the probability that from 166 to 198 will not be enrolled in school?

    c. **3pts**) What is the probability that at most 380 will be enrolled in school?

Q3. 10pts) The average teacher's salary in North Dakota is $37,764. Assume a normal distribution with $\sigma = \$5100$.

    a. 3pts)What is the probability that a randomly selected teacher's salary is greater than $45,000?

    b. 4pts) For a sample of 75 teachers, what is the probability that the sample mean is greater than $38,000?

    c. 3pts) For a sample of 75 teachers, what sample mean is equal to the 95th percentile of all the sample means?

Q4. 10pts) Suppose the annual employer 401(k) cost per participant is normally distributed with a standard deviation of $625, but the mean is unknown.

    a.   **5pts**) If 73.89% of such cost is greater than $1700, what is the mean annual employer 401(k) cost per participant? Suppose the mean annual employer 401(k) cost per participant is $2,258 and the standard deviation is $625.

    b.   **5pts**) If the costs are normally distributed, 31.56% of the costs are greater than what value?

Q5. 10pts) A certain area of the eastern United States is, on average, hit by 6 hurricanes a year. Find the probability that in a given year that area will be hit by

         a.**3pts**) Less than 4 hurricanes.

         b.**3pts**) Anywhere from 6 to 8 hurricanes.

         c. **4pts**) What is the probability of at least one hurricane a month?

Q6. 15pts) The probability that a patient recovers from a rare blood disease is 0.4. If 15 people are known to have contracted this disease, what is the probability that,

     a.   **4pts**) At least 10 survive.

     b.**4pts**) From 3 to 8 survive.

     c.**3pts**) Exactly 5 survive.

     d. **4pts**)What is the mean and standard deviation of this distribution?

Q7. 5pts) Construct a boxplot for the following data which represent the number of innings pitched b the ERA leaders for the past few years. Comment on the shape of the distribution.

192   228   186   199   238   217   213   234   264   187
214   115   238   246

Q8. 5pts) A shipment of 24 computer keyboards is rejected if 4 are checked for defects and at least 1 is found to be defective. Find the probability that the shipment will be returned if there are actually 6 defective keyboards.