Prince Sultan University
Mathematics Department

STAT 101

Second Major Exam

Semester I, Term 141

Thursday, December 11, 2014

Time Allowed:**1: 30** minutes

Student Name: _____

Student ID #: _____ Section #:

Time:

Teacher's Name:

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	10	
2	15	
3,4	10	
5	15	
6	15	
Total	**75**	**/75 = %**

10 points

1. An experiment is made up of two events. First a coin is tossed and the result is recorded (heads/tails) and then a die is rolled.
    a. Find the sample space of this experiment

    b. What is the probability of getting heads and an even number.

2. Let x be the number of courses for which a randomly selected student at a certain university is registered. The probability distribution of x appears in the following table:

15 points

x	1	2	3	4	5	6	7
$\Pr(x)$	.02	.03	.09	.25	.40	.16	.05

a. What is $\Pr(2 < x \le 5)$?

b. What is the probability that a selected student is taking at most five courses?

c. What is $\Pr(x \ge 4 \mid 2 < x \le 5)$?

d. Find the mean and standard deviation of x.

10 points

3. Thirty percent of all automobiles undergoing emission inspection at a certain inspection station fail the inspection.
    a. Among 15 randomly selected cars, what is the probability that at most three fail the inspection?

    b. Among 15 randomly selected cars, what is the probability that between five and seven (inclusive) fail to pass inspection?

    c. Among 25 randomly selected cars, what is the mean value of the number that pass inspection, and what is the standard deviation of the number that pass inspection?

10 points

4. The number of requests for assistance received by a towing service is Poisson distributed with an average of four per hour.
    a. Compute the probability that between two and five requests are received during a particular hour.

    b. Compute the probability that exactly ten requests are received during a particular 2-hour period.

    c. Compute the probability that at least two requests are received during a particular 2-hour period.

15 points

5. The population of a particular country consists of three ethnic groups. Each individual belongs to one of the four major blood groups. The accompanying *joint probability table* gives the proportions of individuals in the various ethnic group-blood combinations.

		Blood Group			
Ethnic Group		**O**	**A**	**B**	**AB**
	1	.082	.106	.008	.004
	2	.135	.141	.018	.006
	3	.215	.200	.065	.020

Suppose that an individual is randomly selected from the population, and define events by A = {type A selected}, B = {type B selected, and C = {ethnic group 3 selected}.

a. Calculate $\Pr(A)$, $\Pr(C)$, $\Pr(A \cap C)$, $\Pr(A \cup C)$.

b. If the selected individual does not have type B blood, what is the probability that he or she is from ethnic group 1?

c. Given that the selected individual has AB blood type, what is the probability that he or she is from ethnic group 2?

15 points

6. A committee of 4 is to be formed from 10 men and 12 women, find the probability of selecting the following:
    a. 2 men and 2 women

    b. 1 man and 3 women

    c. 4 men

    d. At least one woman?