Prince Sultan University
STAT 101
Major II Examination
Spring Semester 2008, Term 082
Tuesday, May 12, 2009
Dr. Quazi Abdus Samad

Time Allowed**: 90 minutes**

Name: _____ _____ _____
(First) (Middle) (Last)

ID Number: _____

Section No.: _____

Important Instructions*:*

You may use CASIO scientific calculator that does not have programming or graphing capabilities.
You may **NOT borrow** a calculator from anyone.
There should be **NO talking** during the examination.
Your exam will be taken **immediately** without any warning if your mobile is seen or heard
You must show all your work beside the problem. Be organized.
You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
This examination has **10** problems with several parts in each case. Make sure that your paper has all these problems.

Problems	Max points	Student's Points
1	10	
2,3	12	
4,5,6	14	
7,8	12	
9,10	12	
Total	**60**	

Question 1 (10 points) The number of household members, *x*, and the amount spent on groceries per week, *y*, rounded to the nearest dollar are measured for eight households in Big Rapids area. The data are shown below:

x	5	2	2	1	4	3	5	3
y	120	50	55	35	95	70	115	65

a. Draw a scatterplot of these data points.

b. Find the correlation coefficient from the above data **using the calculator**

c. Plot the points and the best-fitting line on the same graph (above).

d. Find the best-fitting regression line of y on x for these data.

e. What would you estimate a household of **six** to spend on groceries per week?

f. What is the coefficient of determination and how do you interpret it?

Question 2 (6 points) Two fair dice are thrown.

a. Write down the sample space.

b. What is the probability that the upper faces will add to 8?

c. What is the probability that the upper faces will be less than 10?

d. What is the probability that the upper faces will be greater than or equal to 9?

Question 3 (6 points) a. In how many ways can you select seven people from a group of twelve if the order of selection is important?

b. In how many ways can you select three people from a group of twenty if the order of selection is not important?

c. Four balls are selected from a box containing 15 balls. The order of selection is not important. How many simple events are in the sample space?

d. Eight coins are tossed. How many simple events are in the sample space?

Question 4 (3 points) Evaluate these combinations

a. C^{22}_{5} b. C^{10}_{9} c. C^{50}_{45}

Question5 (3 points) Evaluate these permutations

a. P^{20}_{2} b. P^{10}_{9} c. P^{50}_{45}

Question 6 (8 Points) A sample space S consists of five simple events with the following probabilities:

$P(E_1) = P(E_2) = 0.20$, $P(E_3) = 0.45$, and $P(E_4) = 2P(E_5)$.

a. Find the probabilities for simple events E_4 and E_5

b. Find the probabilities for these two events: *A*: E_1, E_3, E_4 and *B*: E_2, E_4

c.List the simple events that are either in event *A* or event *B* or both

d. List the simple events that are in both event *A* and event B.

Question 7 (6 points) Suppose that P(A) = .4, and P(A∩B) = .12

a. Find P(B/A)

b. Are events A and B mutually exclusive? **Why or why not?**

c. If P(B) = .3, are events A and B independent? **Why or why not?**

Question 8 (6 points) During the inaugural season of major league soccer in the United States, the medical teams documented 256 injuries that caused a loss of participation time to the player. The results of this investigation are shown in the table below.

Severity	Practice (P)	Game (G)	Total
Minor (A)	66	88	154
Moderate (B)	23	44	67
Major ©	12	23	35
Total	101	155	256

If one individual is drawn at random from this group of 256 soccer players, find the following probabilities:

a. P(B) =

b. P(A∩G) =

c. P(C/P) =

Question 9 (6 points) If an experiment is conducted, one and only one of the three mutually exclusive events S_1, S_2, and S_3 can occur with these probabilities:

$P(S_1) = .2, \quad P(S_2) = .5, \quad P(S_3) = .3$

The probabilities of a fourth event A occurring, given that event S_1, S_2, or S_3 occurs, are

$P(A/S_1) = .2, \quad P(A/S_2) = .1, \quad P(A/S_3) = .3$

a. What is the probability that event A occurs?

b. If event A is observed, what is the probability that the sample was selected from population S_2?

c. If event A is observed, what is the probability that the sample was selected from population S_3?

Question 10 (6 points) Let x be a random variable with probability distribution as follows:

X	0	1	2	3	4	5
P(X)	.1	.3	.4	.1	.05	.05

a. Find the mean of the random variable X (**show the formula**).

b. Find the standard deviation of the random variable X (**show the formula**).

c. Find the probability that the random variable X lies outside the range of one standard deviation from the mean (that is, outside the 1-σ limit).