

NAME: _____

Math 124 FALL 2004: Section 6 TTh 8:10-9:35 AM

Midterm 1

Date: Mar 17, 2005

Instructions: Answer all questions. Show as much work as you feel reasonable. You have 75 minutes. To allow others to fully concentrate at the end please do not leave in the last 5 minutes. You should submit your page of notes with your test paper.

Question 1. (25 points)

Suppose that you observe the following data

6.9 7.0 7.2 7.3 7.6 7.8 8.5 8.5 8.7 9.0 9.7 10.2 11.6

(a) Compute the median of this data

(b) Calculate the IQR.

(c) Identify the observations that are outliers using the 1.5IQR rule discussed in class. Make it clear how you identified these observations.

- (d) Draw and interpret the appropriate stem and leaf plot

Question 2. (*25 points*)

Suppose you have three events A , B and C . Furthermore, you have the following probabilities: $P(A) = 0.3$, $P(B) = 0.4$, $P(C) = 0.2$, $P(A \cap C) = 0.08$, $P(B \cap C) = 0.11$, $P(A^C \cap B) = 0.28$ and $P(A \cap B \cap C) = 0.06$.

- (a) Draw the appropriate Venn Diagram to represent all three events. Be sure to show all the probabilities.

(b) Are events A and B independent? How about B and C?

(c) What is $P(A^C \cap C)$?

(d) What is $P(A^C \cup B^C)$?

Question 3. (*25 points*)

Imagine that you carry out a random experiment where you first roll a fair 6 sided dice, then you roll a fair 4 sided dice.

- (a) Give the sample space for this experiment. Then explain what the probability of each individual outcome will be and why.

- (b) Suppose that X is “the square of the larger of the two numbers”. Give the probability distribution of this random variable.

- (c) What are the mean and standard deviations of X ?

Question 4. (25 points)

A scientist, that you are working with, gives you the following data

x	11.0	10.6	16.4	7.6	14.9	9.3	14.8	11.3	11.8	12.8
y	9.3	14.9	0.9	13.2	8.6	8.8	17.0	9.4	15.3	11.2

where each x and y are a pair of measurements taken on the same individual. Note that $\sum_{i=1}^n x_i = 120.5$, $\sum_{i=1}^n y_i = 108.6$ and $\sum_{i=1}^n y_i^2 = 1371.84$.

(a) Compute $\sum_{i=1}^n x_i y_i$, $\sum_{i=1}^n x_i^2$, \bar{x} and \bar{y} .

(b) Compute the standard deviations s_x and s_y .

(c) Compute the correlation between x and y .

(d) Interpret your correlation. What does it say about the relationship between x and y .