

NAME: \_\_\_\_\_

**Math 124 FALL 2004: Section 12 MWF 11-12**

**Midterm 1**

**Date: Oct 1, 2004**

**Instructions:** Answer all questions. It is recommended that you show all work. You have 50 minutes. To allow others to fully concentrate at the end please do not leave in the last 10 minutes. You should submit your page of notes with your test paper.

**Question 1. (25 points)**

Suppose that you have the following data

x	12.8	12.9	12.9	13.6	14.5	14.6	15.1	17.5	19.5	20.8
y	5.5	6.2	6.3	7.0	7.8	8.3	7.1	10.0	10.8	11.0

where each  $x$  and  $y$  are a pair of measurements taken on the same individual. Note that  $\sum_{i=1}^n y_i = 80$ ,  $\sum_{i=1}^n y_i^2 = 675.16$  and  $\sum_{i=1}^n x_i y_i = 1282.74$ .

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

**Question 2.** (*25 points*)

Suppose that you observe the following data

9.0 9.2 9.3 9.6 9.8 10.5 10.5 10.7 12.2 13.6

(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) Sketch the boxplot.

**Question 3.** (*25 points*)

We have a box with 9 tickets. Each ticket is labeled with a distinct number from 1 to 9. We draw two tickets from the box. What is the probability of picking a prime on the first draw  $\{2,3,5,7\}$  and a divisor of 6 on the second draw  $\{1,2,3,6\}$ ?

(a) With replacement?

(b) Without replacement?

(c) Now assume that you draw only one ticket. What is the probability that the ticket is both a prime and a divisor of six?

- (d) Again assuming that you draw only one ticket. What is the probability that the ticket is either a prime or a divisor of six or both?

**Question 4.** (*25 points*)

The length of human pregnancies from conception to birth varies according to a distribution that is approximately normal with mean 266 days and standard deviation 16 days.

- (a) What is the probability of a pregnancy lasting less than 235 days?
- (b) What is the probability that a pregnancy will last between 250 and 280 days?
- (c) What is the probability that a pregnancy lasts more than 280 days?