

# Mthsc 301: Statistical Methods

## Test 2

### Closed Book/Notes

October 20, 1999

Each question is worth 20 pts.

1. We want to determine the best conditions for growing wheat (get the best yeild/acre) on a farm. We would like to see the effect of irrigation, fertilizer and the type of seeds on the yeild. There are three types of irrigation (natural, partial water supply and full supply), three types of fertilizers (a,b,c) and two types of seeds( s1 and s2).

(a) What are the factors in this study?

(b) What is the response variable?

(c) Write the treatments for this study

(d) Draw a diagram to describe the design of the above experimnt.

(e) How many plots of 1 acre is needed if you plan to have at least two values per treatment?

2. It is known that 90% of all job seekers get their first job through a connection to someone in the place of work. If 8 people who got their first job recently were sampled, what is the probability that

(a) none of them got the job through a connection

(b) all got the job through a connection

(c) at most seven got the job through a connection

(d) less than 2 got the job through a connection

3. 24% of all tax returns have an error. If 400 returns were examined, what is the probability that

(a) at most 105 had errors

(b) more than 88 had errors

4. You plan to predict remission time ( $R$ ) from a disease based on the initial white blood count (WBC).

(a) what should be the  $x$  variable here? Why?

- (b) It is known that the equation relating R and WBC has a positive slope and  $r^2 = 0.85$ . What is the correlation coefficient?
- (c) If the line has a slope of 1.4 and intercept of 20, what would you expect the remission time to be for a WBC of 500?
5. The number of defects on a plywood sheet averages 4 per sq. ft. with a standard deviation of 3.9.
- (a) We examine 300 sq.ft. of plywood over a week. What is the probability that the total number of defects was at most 1335?
- (b) How many sq ft of plywood must be inspected so that the average number of defects per sq ft. for those would be at most 4.1 with a probability 0.95?