

**SCCC 312 - Fall 2002 - Practice Final** The final will consist of 2 questions each on 5 main areas from the first two exams: descriptive statistics, regression, probability, binomial random variables, and confidence intervals. You will need to answer 8 of those 10 questions. You will also need to answer 6 questions about hypothesis testing. All fourteen questions will be counted equally.

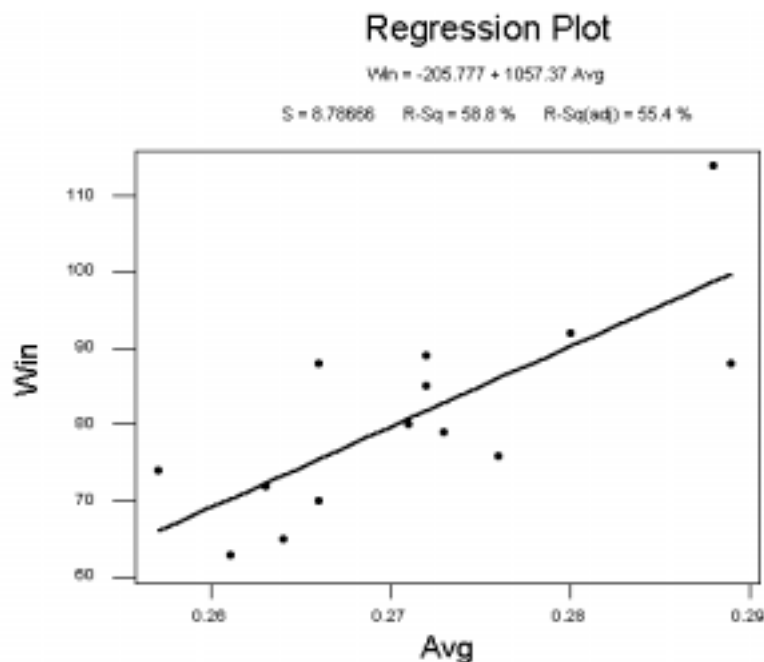
**Part I: Answer 8 of the following 10 questions:**

1) A 1500 student, very selective, liberal arts school also has a bridge program that they use to benefit the local community. Through this program 40 students out of the entering class of 400 are accepted even though they have significantly lower GPAs. Would the school prefer that the mean or that the median GPA be reported if they want to maintain the appearance of being highly selective?

2) For the following data set: 8oz 10oz 6oz 12oz Calculate both the mean and the median.

*[Also see questions 4-7 in part I, or question 1 in part II of the first hour exam for more good questions.]*

The MINITAB output below is used for questions 3-5. It is a linear regression to predict the number of games won from the batting average for the 14 teams in the American League for the 1998 season.



3) What is the estimated number of wins for a team with a batting average of 0.285?

4) On average, how far off to you expect the actual winning percentage to be from the percentage you estimate using the regression line?

*[Other good questions: What percentage of the variation in win percentage is explained by the teams' batting averages? What would be wrong with predicting the wins for a team with an average of 0.300?]*

5) A jury pool contains 8 Hispanics and 42 non-Hispanics. What is the probability that all six of the people selected for the Jury on the first day would be non-Hispanic?

6) A bin contains 50 balls numbered from 1-50, and all of the balls are reshuffled after each of six drawings. What is the probability that all six numbers would be from 9-50?

*[Also see questions 1-4 on the second hour exam for more good questions]*

Questions 7-8 use the following situation: A departmental photo-copier is known to jam on 4.8% of the copy jobs it is asked to perform. On an average day it is used for 85 jobs.

7) What is the expected number of jams and the standard deviation of the number of jams on an average day?

8) Find exactly the probability that 2 or fewer jams would occur on an average day. (You do not need to simplify).

*[Other good questions: Use the normal approximation to the binomial to find the probability that 8 or more jams will occur on an average day. What must you assume about the copier uses to do use the binomial?]*

Questions 9-10 use the following situation: In order to study the weights of newborn babies in the area it serves, Northside Hospital randomly selects the records of 20 newborns from the year 2001. The weights of each of these 20 are measured to find a mean of 6.87lbs.

9) In the words of the above problem identify the following:

population:

sample:

variable:

parameter:

statistic:

10) The standard deviations of the baby weights is reported to be 1.76lbs. Construct a 95% confidence interval for the average weight of new born babies in the area served by Northside Hospital.

*[Another good question: What assumption about the weights of newborns needs to be true in order for you to trust the confidence interval you formed in question 10? How would you check this?]*

## **Part II: Answer all of the following six questions**

Questions 1-4 use the following situation: An incumbent senator has decided not to spend any advertising money until he has evidence that his support has fallen below 55%. A survey of 1,000 registered voters is taken and 502 of them indicate they plan on voting for the senator.

1) Identify the parameter of interest and state the null and alternate hypothesis.

2) What would a Type I error and a Type II error mean in this case?

3) Find the p-value for testing the hypothesis you stated.

4) At  $\alpha=0.05$  should the senator start advertising?

5) A random sample of size 20 results in an average weight loss of 10.4 lbs. and a standard deviation of 4.3 lbs. At an  $\alpha=0.05$  level do you accept or reject  $H_0: \mu=8$  vs.  $H_A: \mu>8$ .

6) (Circle the correct answers.) As  $\alpha$  increases you are more / less / equally likely to commit a Type I error, but more / less / equally likely to commit a Type II error.