

# Math 160 K

## SECOND HOUR EXAM

NAME \_\_\_\_\_

### **General Notes:**

1. Show work.
2. Look over the test first, and then begin.
3. Calculators are permitted on this exam, but only for basic arithmetic (i.e., no statistical calculations)

Friday, October. 23, 2009  
100 pts.

I. Some definitions (5 pts. each) Give brief definitions of the following:

a. Scatterplot

b. Least squares regression

c. Lurking variable

d. Treatment

e. Factor

## General Questions

1. (10 pts.) (from example 1.27). The combined SAT scores is approximately normal with a mean of 1026 and standard deviation 209. Suppose a student has a combined SAT score of 1150. What is the corresponding z-score? What percentage of scores are above this score? Please use Table A in your answer, saying how you used Table A for your answer.

1. Some questions about relationships.

- a. (10 pts.) What graphs might you use to examine the relationship between

1. Two quantitative variables?

2. A quantitative response variable and a categorical explanatory variable?

3. Two categorical variables?

- b. (10 pts.) In a scatterplot, what do we mean when we say that one variable is an explanatory variable and the other is a response variable?
- c. (10 pts) Give the definition of the correlation  $r$  between two sets of observations  $x_i$  and  $y_i$ , explaining the terms in your definition.

d. Suppose that we know that for two variables  $x_i$  and  $y_i$  we have  $\bar{x} = 1997.7, s_x = 6.02$  and  $\bar{y} = 272.17, s_y = 6.05$  and a correlation  $r = 0.97$ . Please answer the following questions:

1. (5 pts.) What fraction of the variance in the y-values is explained by least-squares regression on the x-values?
2. (10 pts.) Given these data with y as the result variable and x as the explanatory variable, give first a formula for the slope  $b_1$  of the least squares regression line and then calculate it using the values given above.
3. (5 pts.) With the same data, give a formula for the intercept  $b_0$  of the least squares regression line and then calculate that value.
4. (5 pts.) Finally, write the equation of the least-squares regression line and predict a  $\hat{y}$  for  $x = 2006$ .

- f. (10 pts.) A sample of five students is to be taken from a class of 40 students, numbered 01 - 40. Using table B and starting at line 130 using the methods described in the textbook and in class to find these 5 students (by the numbering scheme).