**Quantitative Methods**

**Final Exam**

**Spring 2010, Hill**

**Part One: Long-Answer**  
*Answer the following questions thoroughly, using your own words to define, explain, and illustrate.*

1. How is it that we are able to make such accurate estimates about an entire population by using a tiny fraction of observations drawn from that population? Explain and define in your own words the theories and practices that make this possible.

2. Recall the following formulae for a large, two-sample hypothesis test. Into these formulae there are three inputs: *N*, *s*, and \bar{x} \!\,. Define these inputs. Explain the role of each in determining the value of Z, and ultimately, whether there will be statistical significance.

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**Part Two: Interpretation of Statistical Methods, Output, and Results**

*About this data: the data from which this output is generated is real data on adolescents in New York City that have a history with substance abuse. All of the questions in the analysis are about behavior related to drug and alcohol use (‘P90’ in the variable labels stands for ‘In the Past 90 Days’). Other variables get at health, legal troubles, and characteristics of the respondent.*

3. Interpret the following output. Indicate the type of hypothesis test used. Specify the dependent variable and the independent variable(s). What might the researcher be trying to do, and what do you suppose the hypothesis is? In detail, interpret the results—describing the results with a conversational tone, but also reporting the important technical details.









Part 3b:

What does the following output add to your understanding of the output above? Do you see any potential problems? How do you know whether or not these problems exist?

**Correlations**



Room to answer question #3 & 3b:

4. Interpret the following output. Indicate the type of hypothesis test used. Specify the dependent variable and the independent variable(s). What might the researcher be trying to do, and what do you suppose the hypothesis is? In detail, interpret the results—describing the results with a conversational tone, but also reporting the important technical details.





Room to answer question #4:

5. Interpret the following output. Indicate the type of hypothesis test used. Specify the dependent variable and the independent variable(s). What might the researcher be trying to do, and what do you suppose the hypothesis is? In detail, interpret the results—describing the results with a conversational tone, but also reporting the important technical details.





Room to answer question #5:

6. Interpret the following output. Indicate the type of hypothesis test used. Specify the dependent variable and the independent variable(s). What might the researcher be trying to do, and what do you suppose the hypothesis is? In detail, interpret the results—describing the results with a conversational tone, but also reporting the important technical details.





Room to answer question #6:

7. Interpret the following graph. What kind of graph is this? And what does it tell you? (Your response may be brief; 3-4 sentences are sufficient.)

**Graph**



Room to answer question #7:

8. Consider the following research question: I’m interested in knowing if there is any connection between substance abuse and diabetes. Particularly, since substance abuse and diabetes are such a deadly combination, I’m curious to see if those with a family history of diabetes are less likely to have a family history of substance abuse (however, the research hypothesis will be to look for difference in either direction). There are two variables available for this analysis: 1) whether someone has a family history of substance abuse (yes or no) and 2) whether someone has a family history of diabetes (yes or no).

Four sets of output are available for this analysis (see the following pages). Circle the most appropriate set of output:

1. **8A**
2. **8B**
3. **8C**
4. **8D**

In four or five sentences, briefly explain why you chose the output you did, the results, whether there is statistical significance, and what this says about the research question:

**Output 8A**





**Output 8B**





**Output 8C**



*Output 8C continued:*



**Output 8D**





