

ID# \_\_\_\_\_

Exam 1

PS 217, Spring 2005

Read each question carefully and answer it completely. Show all your work. Think of the point value for each question as an index of the time it should take to complete your answer. Thus, if you spend 20 minutes on a 10-point question, you may not be able to complete the exam. As always, the Skidmore Honor Code is in effect, so I will ask you to indicate your adherence to the Code at the end of the exam. Good Luck!

1a. Dr. Lou Swate runs a behavioral weight loss clinic, in which people are given a behavior modification regimen for losing weight. Below you have data from a sample of 11 overweight people who have enrolled in his program. The data represent pounds of weight lost after a week on the program. For these data, estimate the weight loss one would find in the population from which the sample was drawn in terms of both central tendency (mean) and variability (variance). [10 pts]

Weight Loss
2
4
3
6
2
4
3
2
5
3
7

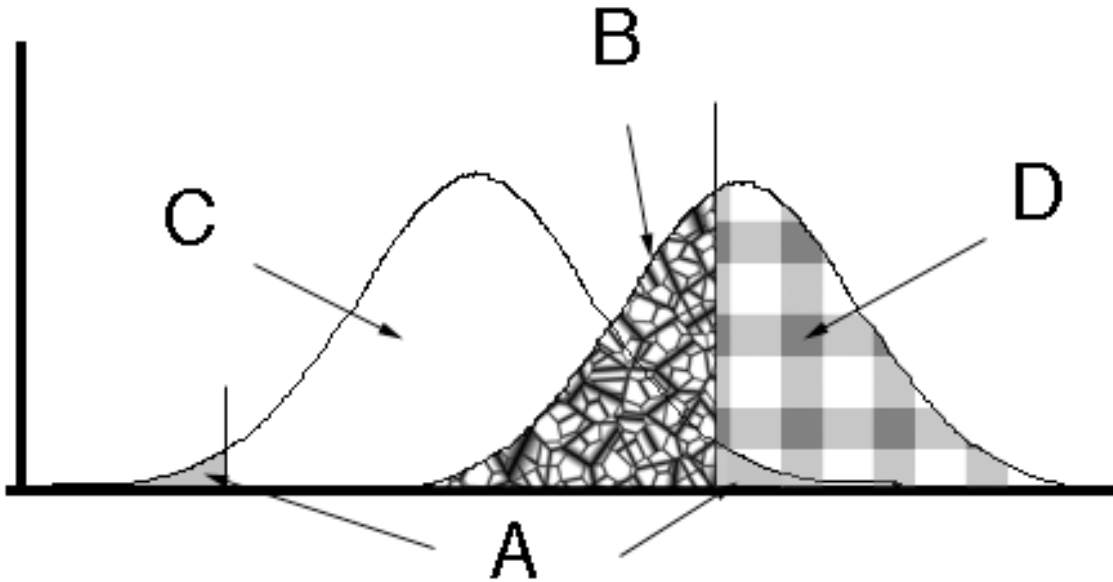
1b. Test the null hypothesis that these data were drawn from a population experiencing weight loss of 5 pounds, which is what Dr. Swate claims people should lose in one week. [10 pts]

1c. What is the size of the effect found in the prior analysis? [3 pts]

1d. What kind of error might you be making in your decision? [1 pt]

1e. If the effect size were larger, what would be the likely effect on your decision? Why? [1 pt]

2. Label the graph below appropriately:



The distribution on the left represents  $H_0$  True. The distribution on the right represents  $H_0$  not true. So, in terms of hypothesis testing, what do A, B, C, and D represent? [2 pts]

Letter	Label	Letter	Label
A		C	
B		D	

3. You should recognize a few similarities between the curves in hypothesis testing (as above) and the curves in a signal detection paradigm. Indicate three similarities below: [3 pts]

In Hypothesis Testing Terms	In Signal Detection Terms
	$d'$
	Hits
	Misses
	False Alarms
	Criterion

4. As you know, IQ is normally distributed with  $\mu = 100$  and  $\sigma = 15$ . Use that information to answer the following questions. [10 pts]

a. What is the probability of having an IQ between 115 and 125?

b. What is the probability of drawing a sample of  $n = 25$  people and finding a mean IQ equal to or greater than 110?

c. What two IQ values determine the middle 80% of IQ scores in the population?

d. For samples of  $n = 100$ , what sample means would determine the middle 80% of IQ scores?

e. What is true about the sampling distribution of the mean as your sample size increases? [Need to talk about several points.]

5. Miscellaneous questions [10 pts]

a. If you are looking for a small effect (low  $d$ ), what would you need in order to be able to reject  $H_0$ ?

b. What is the definition of the median?

c. If you were to add a constant to all the scores in a sample, what would happen to the sample variance?

d. Why is the SS not a good measure of variability?

e. In a positively skewed population, with  $\mu = 85$  and  $\sigma = 10$ , what percentage of scores would be above 85?

f. Michael Jackson is currently on trial. If you think of a court decision in Hypothesis Testing terms,  $H_0$  would be that Michael Jackson is not guilty.

In terms of court decisions, what is a Type I Error?

In terms of court decisions, what is a Type II Error?

Which does our judicial system see as the more serious error? Why?

g. Suppose that you are computing a t-test with  $t_{\text{crit}} = 1.96$ . What can you tell me about that t-distribution?

h. If your t statistic came out as 1.94, what would you decide and what would you do next?