ID# _____ Exam 1 PS 217, Spring 2011

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!

1. Answer the following questions assuming that they are dealing with a population of IQ scores, which are normally distributed with $\mu = 100$ and $\sigma = 15$.

a. What is the probability that a person has an IQ score between 120 and 130? [3 pts]

b. What is the probability that a person has an IQ score between 95 and 110? [3 pts]

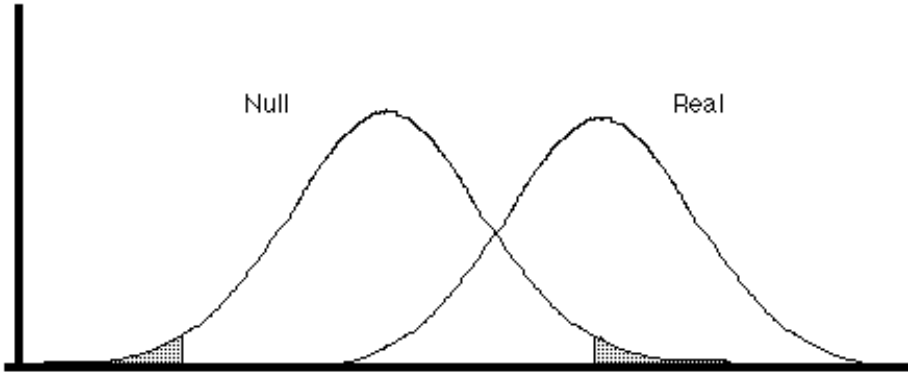
c. What IQ scores would be achieved by the upper 85% of the population? [3 pts]

d. What IQ scores would be achieved by the lower 10% of the population? [3 pts]

e. What is the probability that a sample of $n = 25$ would yield a mean (M) IQ of 102 or more from this population? [4 pts]

f. For samples of $n = 100$, what mean IQ scores would comprise the middle 95% of the sampling distribution of the mean? [4 pts]

2. On the curves seen below, *clearly* label the areas that represent Type I Errors, Type II Errors, Power, and Correct "Retention." [5 pts]



3. In this semester's PS 306 first lab, we collected data from a sample of students, including GPA. Tell me as much as you can about the SPSS analysis of the data seen below, including the interpretation/conclusion. [5 pts]

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
GPA	42	3.4393	.34419	.05311

One-Sample Test

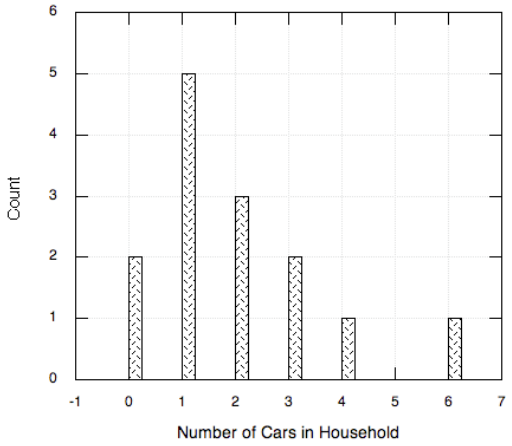
	Test Value = 3.3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
GPA	2.623	41	.012	.13929	.0320	.2465

4. In a prior year's lab, we also obtained GPA data. Using the output below, test H_0: $\mu = 3.3$. [10 pts]

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
gpa	47	2.80	3.90	3.3748	.29606
Valid N (listwise)	47				

5a. Below are data about the number of cars owned in a sample of households in Saratoga Springs. ***Estimate*** μ, σ^2, and σ of the population from which the sample was drawn. [10 pts]



5b. Given the above data, could you compute a *z*-score to test H_0: $\mu = 2.0$? Why or why not? [2 pts]

5c. What is the median of the data set? Which measure of central tendency would you prefer for this data set, the median or the mean? Why? [3 pts]

6. If you were interested in estimating σ^2 for some (huge) population, what procedure would you follow? [3 pts]

7. As you saw in that lab, you can use *z*-scores to determine a measure of sensitivity (d'). Suppose that on a recognition memory test, a person got 90% hits and 5% false alarms. What d' would that person receive? [5 pts]

8. Some semi-random questions:

a. Suppose that your population is very strangely shaped (e.g., multimodal and skewed). If you were to translate all the scores in the population to *z*-scores, what can you tell me about the transformed distribution in terms of central tendency (i.e., mean), variability (i.e., standard deviation), and shape? [2 pts]

b. For that same strangely shape population, what can you tell me about the shape of the sampling distribution of the mean derived from that population? [2 pts]

c. You have a sample of 10 scores with $M = 20$. You remove one score ($X = 10$). What is the mean of the new sample (with $n = 9$)? [1 pt]

d. In one distribution, with $\mu = 80$ and $\sigma = 10$ you have a score of 85. Translate that score into an equivalent score in a distribution with $\mu = 300$ and $\sigma = 100$. [2 pts]

e. You've obtained a sample mean of $M = 80$. Test the null hypothesis that the mean was obtained from the distribution with $\mu = 80$ and $\sigma = 10$. [5 pts]