ID# _____ Exam 1 PS 217, Spring 2010

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 SAT-M scores, which are normally distributed with $\mu = 500$ and $\sigma = 100$.

a. What is the probability that a person would achieve SAT-M scores between 550 and 650? [3 pts]

b. What is the probability that a person would achieve SAT-M scores between 430 and 480? [3 pts]

c. What SAT-M scores would be achieved by the lower 65% of the population? [3 pts]

d. What SAT-M scores would be achieved by the upper 5% of the population? [3 pts]

e. What is the probability that a sample of $n = 25$ would yield a mean (M) SAT-M of 440 or less from this population? [4 pts]

f. For samples of $n = 100$, what mean SAT-M scores would comprise the middle 90% of the sampling distribution of the mean? [4 pts]

2a. Below is a sample of quiz scores. *Estimate* μ, σ^2, and σ of the population from which the sample was drawn. [5 pts]

	Quiz	$Quiz^2$
	8	64
	7	49
	3	9
	8	64
	9	81
	10	100
	7	49
	6	36
	8	64
	9	81
	7	49
	6	36
	8	64
	3	9
	8	64
Sum	107	819

2b. If you were testing H_0: $\mu = 8.5$, what statistic would you use? Why? [2 pts]

2c. If you were testing H_0: $\mu = 8.5$, what would be your effect size *d*? [3 pts]

3a. As you know, gestation periods are normally distributed with $\mu = 268$ and $\sigma = 16$. Imagine that you are giving a talk to 64 pregnant women who happen to be cigarette smokers. Suppose that you want to tell them what the average (mean) gestation period would be for a group that size and you want to be 90% confident in your estimate. What would you tell them about the upper and lower limits that would encompass the typical mean gestation period for a group of 64 women? (In other words, what gestation periods cut off the upper and lower 5% of the distribution?) [5 pts]

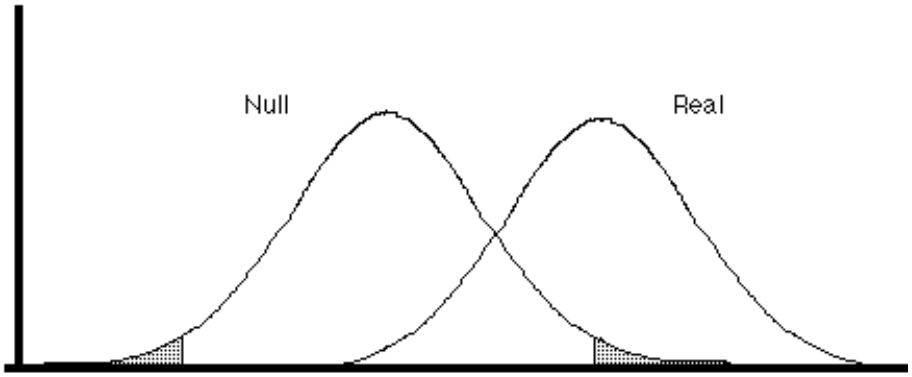
3b. Suppose that for this sample of 64 smokers, the mean gestation period $M = 260$ days. How likely is it that your group was sampled from the normal distribution described in 3a?

State the null and alternative hypotheses you would be using to test the assertion. [1 pt]

Test the null hypothesis. What you would conclude? (Be explicit!!) [9 pts]

Tell me, in words, what kind of error you might be making in your conclusion. [2 pts]

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



5. What is the general formula for all standard scores? [2 pts]

6. Suppose that you take one sample of $n = 16$ and another sample of $n = 100$. What does the Central Limit Theorem tell you about the shape and variability of the sampling distribution of the mean from which each sample mean would have been drawn? [5 pts]

7. What is the (small) advantage of using the standard deviation instead of the variance as a measure of variability? [2 pts]

8. Under which conditions might the median be a better measure of central tendency than the mean? [2 pt.]

9. Interpret the PASW/SPSS output below as completely as you can. (In other words, what is the statistic, what are the scores, how would you interpret the results, etc.) [3 pts]

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Quiz	15	7.1333	1.99523	.51517

One-Sample Test

	Test Value = 8.5					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Quiz	-2.653	14	.019	-1.36667	-2.4716	-.2617

10. Adding a constant (e.g., 3) to a set of scores has what effect on the mean and standard deviation of the transformed scores? [2 pts]

11. Transforming a set of scores into *z*-scores has what effect on the mean and standard deviation of the transformed scores? [2 pts]

12. Signal Detection Theory shares many characteristics with Null Hypothesis Significance Testing (NHST). [2 pts]

What would be the Signal Detection analog of effect size?	
What would be the NHST analog of proportion hits?	

13. The probability of making a Type I Error is typically set to ☐ %. [1 pt]

14. As the sample size approaches infinity, what happens to the value of $t_{Critical}$ and why? [2 pts]

15. In a positively skewed distribution, what is the relationship between the mode, median, and mean? [2 pts]