



"And one final warning before we begin the exam — any stray eyeballs will be immediately thumped."

As always, the Skidmore Honor Code is in effect. You will be asked to sign a sheet attesting to your adherence to the code at the end of the exam. Read each question carefully and answer as completely as you can. Show all your work, so that I can give you partial credit. Because I think of a point as a minute, you should pay careful attention to the point value for each question. Good luck on the exam!

1. In a short sentence, define power (1 –). Then, tell me a strategy for making your statistic more powerful...being careful to articulate how that strategy works. [5 pts]

2. Suppose that during impersonal social interactions (that is, with business or casual acquaintances) people in the United States maintain a mean social distance of $\mu = 4$ feet from the other individual. This distribution is normal and has $\sigma = 1.5$. A researcher examines whether or not this is true for other cultures. A random sample of $n = 8$ people of Middle Eastern culture is observed in an impersonal interaction. For this sample, the mean distance is 2.5 feet. Test the hypothesis that the Middle Eastern sample was drawn from a population with $\mu = 4$. [10 pts]

3. Define the term “standard error.” What is the formula for standard error? [5 pts]

4. Suppose that you take a random sample of $n = 9$ students on their way to an 8AM class in TLC and ask them for their GPAs. Their data are seen below. What is your best estimate of the μ and σ for the population from which this sample was drawn? [10 pts]

3.4
3.3
3.0
2.8
3.6
3.4
3.5
3.8
3.2

5. Given the sample of GPAs obtained above, and assuming a normal distribution of GPAs, how likely is it that your sample was drawn from a population with $\mu = 3.1$? [10 pts]

6. As you know, we can treat IQs as normally distributed with $\mu = 100$ and $\sigma = 15$. [15 pts]

a. What percentage of the population would have IQs between 80 and 90?

b. What percentage of the population would have IQs greater than 110?

c. What percentage of sample means from samples of size $n = 9$ would have IQs greater than 110?

d. What percentage of sample means from samples of size $n = 25$ would have IQs greater than 110?

e. Why are your answers to c and d different? What process does the difference reflect?