STATISTICS FOR ENGINEERS
ASSIGNMENT VII
OCTOBER 15, 2010

This homework assignment deals with problems from Chapters Four and Five. Please make sure you read the questions thoroughly and think about them before you begin your answer. There are five problems, each worth two points. Make sure you show all your work and that you state your assumptions clearly.

Problem 7.1

You are in charge of quality control in a watch assembly plant. In order to assemble acceptable watches, you must receive acceptable parts. Each week, Bakugan Industries supplies exactly 1000 watch faces to your plant. You want to make sure that they supply no more than ten faces that are not acceptable. Unfortunately, the test you use is a destructive test; that is, when you test a watch face, you destroy it in the process. As such, you are not allowed to test all 1000 faces. The owner allows you to test ten watch faces each week — no more. Last week, you found that two of the ten tested faces failed the test.

What is the probability that Bakugan Industries supplied you only ten bad faces in that week's batch of 1000?

Problem 7.2

A start-up polling firm polled 500 people about their choice for the upcoming gubernatorial election in Oklahoma. Of those people, 165 stated they would vote for Jari Askins and 188 said they would vote for Mary Fallin. The rest were undecided voters.

What is the probability that more people in Oklahoma support Fallin over Askins?

Problem 7.3

A recent final examination contained two questions. Oddly enough, the distribution of scores on the first question was distributed $Q_1 \sim \mathcal{N}(\mu = 50, \sigma^2 = 5)$, and the distribution of socres on the second question was distributed $Q_2 \sim \mathcal{N}(\mu = 45, \sigma^2 = 7)$. In the class, what was the probability that a student scored more than 100 points on the examination?

Problem 7.4

The total vote for Candidate Pan in each district of Neverland follows a lognormal distribution, with $\mu = 3$ and $\sigma^2 = 4$. What is the average district vote for Pan? What is the variance of the district vote for Pan? If we define W as the natural logarithm of the district vote ($W = \ln[X]$), what is the probability that W is greater than 4 ($\mathbb{P}\left[W > 4\right]$)?

Problem 7.5

For Problem 7.5, make sure you explain your findings and which tests you used. Problem 7.5 should be more than a paragraph in length: the first paragraph outlining your procedure, the second paragraph giving you conclusions (and statistics).

Using the `crime.csv` dataset, is there a difference in violent crime rates between the South and the West? If so, which has a higher violent crime rate?