Homework 1

September 12, 2011

Assigned: Monday, September 12, 2011.
Due: Monday, September 19, 2011.

Textbook: Chapter 2 - # 3, 6, 7, 11, 13, 17, 19, 22.

Additional Problems:

1. Is a metre stick really a metre?
   You’re asked to verify whether the metre sticks sold by a company (call them company 1) are actually a metre long. To do this, you go out to your local hardware store, and examine 20 different metre sticks. Their lengths, in centimeters, you find are:


   (a) What are the subjects of interest?
   (b) What are the data elements in this study?
   (c) What is the population?
   (d) What is the sample here?
   (e) Give at least three descriptive statistics, including the mean and variance.
   (f) Would you recommend the metre sticks produced by this company to the local high school? Why or why not?
   (g) Suppose company 2 also sells metre sticks. You sample 20 of them, and find their lengths (again in centimeters) to be

   100.071, 100.014, 100.009, 100.079, 99.959, 100.034, 100.041, 99.9878, 100.010, 99.9417, 99.942, 100.005, 100.036, 100.129, 99.966, 100.009, 99.995, 99.903, 99.978, 99.9103.

   Which company’s metre sticks (if either) would you recommend to the local high school? Explain your answer.
   (h) How can you account for the distribution in sizes of a metre stick?

2. In class, we defined the sample variance \( s^2 = \frac{\sum (x-\bar{x})^2}{n-1} \). Prove that

   \[ s^2 = \frac{\sum x^2 - \left(\frac{\sum x}{n}\right)^2}{n - 1}. \]