Part VII
Chance Models

Chapter 24: A Model for Measurement Error

Before starting this chapter, it might be a good idea to review chapter 6. In chapter 6, we used the average of the observed measurements to estimate the actual size of the object. And we noted that the SD of those mesurements gives us some indication of how far off the measuring device should be each time it is used.

This chapter creates a model that enables us to apply our knowledge about the accuracy of an average to the measurement error problem of chapter 6.

This chapter may not be emphasized too much on Test 4 and the final examination, but it is a very useful example of inferential statistics in action. Those in the hard sciences might end up applying these methods to other courses. Also, basic theory and sampling theory are used extensively and thereby made more meaningful and understandable. Though difficult, chapter 24 is worth the effort.

Section 24.1: The box on page 443 is important.

Suggested problems for study: A: page 444: 2–4; also (a review problem) page 445: 5.

Section 24.2: Just read. Important boxes are on pages 445 and 446.

Suggested problems for study: B: page 449: 2, 3; also (of lesser importance) 1, 5.

Section 24.3: An important model. Important boxes are on page 450 and 451.

Suggested problems for study: C: pages 452–454: 1–8.

Section 24.4:
The box on pg. 455 is very important in applications of this course and statistics in general.

Chapter Summary: page 457: points 1 through 7 are all important.

Review Exercises

(In Fall 2017, only problem 10 is assigned to be passed in.)
Homework (pages 455 and 456): 1, 2, 3, 10 (problem 10 is a very important review problem)

Comments on HW:

Problem 1 has parts that are somewhat similar to parts of problem 2 on pages 425 and 426, and problem 10 on pages 427 and 428, both from chapter 23.

Problem 2 tests a fundamental idea of the course. It is rather tricky. It is somewhat similar to parts of problem 10 on pages 427 and 428 from chapter 23.

Problem 3 is straightforward. Just apply the procedure of this chapter.

Problem 10 is a very important question as it gets to the heart of sampling theory. Do sufficient research to get a definitive answer to this problem and explain it. This problem is not intended to be tricky, but read the quote carefully before answering, and watch the definition of each of its terms.

Also look at problems 4, 7, 8, and 9 on page 456;
and (of lesser importance) problem 6 on page 456, and problem 11 on pages 456 and 457.