Assignment 2

Due Wednesday, September 26

This assignment replaces the version of Assignment 2 on the next page.

This assignment covers three lectures, and is therefore longer (with more problems assigned to be turned in, and more uncollected problems) than our usual assignments. Please don't skimp on this account—do all the problems. This is very important material.

Exercises: (P = Problems, TE = Theoretical Exercises)

Chapter 2:	P	2, 6*, 8, 10, 12*, 14, 15, 25, 27*, 28, 30, 33, 40*, 42, 45*, 55*
	TE	1, 2, 4, 6, 10, 11*, 12, 16, 19*

*Problems marked with an asterisk will be collected and graded. Remember to *explain* how you arrive at your answers.

These problems coincide with those of the same numbers in the fifth edition of our text.

Hints: P: 12. A Venn diagram may help. Explain your reasoning in enough detail that I can follow all the steps.

28. When sampling without replacement we may either think of ordered samples (there are $19\cdot 18\cdot 17$ of these) or unordered samples (there are $\binom{19}{3}$); the latter is usually simpler. When sampling with replacement we *must* use ordered samples (there are 19^3).

40. You should assume that the owner of a broken set chooses a repairer at random.

45. This is a bit like the birthday problem (Example 5i)..

55. Use inclusion/exclusion (Proposition 4.4)..

TE: 1, 2, 4. For 1 and 2 you can understand why the conclusion is true using a Venn diagram argument, as we did in class. For these, and for 4, try to give also an argument in words. Follow the model of the proof of the first DeMorgan law on the bottom of page 28.

6. Express your answer in terms of E, F, and G, using set operations of union, intersection, and complement. Examples: (a) EF^cG^c, (f) $E^cF^cg^c$ or $(E \cup F \cup G)^c$ (using a DeMorgan law).

10. This is a special case of the general inclusion/exclusion formula. Give a proof similar to the proof of Proposition 4.3, or use Proposition 4.3 itself twice.