Take-home test. October 29, 2009

Hand in November 3, 2009.

You will be graded 50% on exposition and 50% on correctness. Thus, a correct solution will not receive full credit unless all assumptions and all reasoning are explained briefly and precisely in full sentences. On the other hand, if you describe carefully and clearly what you are attempting to do, you may receive substantial credit even if you fail to find a solution.

You may use any source you wish, but you must write your paper on your own, with no reference to another student's paper. No two papers should contain identical phrasing. If I find identical phrases on two papers, I may decide to question both authors. (In effect, your test will become partly oral.)

Do the following problems:

Page	problem
185	2
199	26
213	20
226	20
229	20

Extra Credit Problem. A jar contains k red beads and $n-k$ white beads.

a) Beads are drawn one at a time **with replacement** until k red beads have been drawn. On average, how many beads must be drawn?
b) Suppose m beads are removed **_without_ replacement.** On average, how many red beads are obtained?
c) Beads are removed one at a time **_without_ replacement** until all k of the red beads are obtained. On average, how many beads are taken?

Comments. Your book (section 5.3) includes formulae directly applicable to parts a) and b), rendering these parts quite easy. But it does not discuss a method directly applicable to part c). For this part, you must use your basic knowledge of discrete probability to formulate your own approach.