Name:

Collaborator(s)[1]:

Math 213, Section F1, Prof. Hildebrand, Fall 2010
Graded HW Assignment 4, due Friday, 10/1/2010

Instructions

- **Use this sheet as cover sheet and staple it to the assignment.** Do the problems in order, and make sure that each problem is clearly labelled. Leave plenty of space for the problems. **The assignment is due in class on the above date; late homework, or homework dropped off in mailboxes, will not be accepted.** See the Course Information Sheet for the policy on "excused" homework.
- **Write-up:** Solutions, rather than answers, are required. An answer alone will not earn credit. The solutions must be written up in a clear, logical manner, using correct mathematical terminology and notation, and any key steps explained. **See below for any specific instructions on the write-up.**
- **Getting help:** Open House hours are Wednesdays/Thursdays, 5 pm - 6 pm, in 159 Altgeld. The Open House is intended as informal get-together and office hour for students in my classes. Take advantage of this opportunity!
- **Group work policy:** Work on the problems with another student or in a small group is fine and, indeed, encouraged, **provided** (i) you write up solutions yourself, using your own words, and (ii) you indicate the names of the student(s) you worked with on the cover sheet.
- **Write-up for combinatorial problems from Chapter 5:** Most problems have a numerical answer (such as $15,600$ or $63,273,600$). These numerical answers are the result of multiplying out "raw" counts like $26 \cdot 25 \cdot 24$ or $26^6 + 26^6 - 26^4$. Leave your answers in the latter, "raw", form, rather than getting a numerical answer. **For grading purposes, a numerical answer is irrelevant, and a numerical answer alone will not earn credit. You must show how you arrived at your answer, for example, using a notation such as** $\underbrace{26 \cdot 26}_{\text{2 letters}} \cdot \underbrace{10 \cdot 10 \cdot 10}_{\text{3 digits}}$**.**

Problems (from Rosen, 6th Edition, Sections 5.3 and 5.2)

1. 5.3: 16
2. 5.3: 17
3. 5.3: 19
4. 5.3: 21(a)–(c)
5. 5.3: 23
6. 5.3: 25(a)–(e)
7. 5.3: 27
8. 5.3: 31
9. 5.4: 8
10. 5.4: 10
11. 5.4: 12

See back of page for some tips

[1] If you worked with another student or in a small group on this assignment, list the names of all students involved.

Tips

Here are some more tips on how to approach combinatorial problems.

- **Do not use calculators except to check numerical answers against those in the back of the book.** This is a no-calculator class, you won't be able to use calculators in exams, so you should get into the habit of doing problems without a calculator. As mentioned, you can and should leave all answers in raw form, e.g., in terms of binomial coefficients or factorials.
- **Do not use brute force methods to get answers.** For some problems the numbers are small enough that one could, in principle, get the correct counts by simply listing all cases. Don't do this! The problems are meant to practice general techniques discussed in class. Using brute force counting defies this purpose, they won't prepare you for cases involving larger numbers or unspecified n's, and you may not earn credit for numerical answers arrived by brute force counting rather than an answer in a raw form (like the one shown above) which clearly shows the method behind it.
- **Do not use guessing to arrive at answers.** For similar reasons, don't try to obtain answers by working out the first few cases and then guessing the general case without really understanding why the formula holds. You won't earn credit for a formula obtained by guessing.
- **For more complex counting problems, try to explicitly write out some simple (but typical) cases, to get a "feel" for the problem and the correct approach.** The point of such experimenting with small cases is **not** to come up with a guess, but rather to come up with the right way to approach the problem. For example, by writing out explicitly some instances of what you need to count it may become clear whether something requires "ordered" or "unordered" counting.