Name: Section (circle one): 9 am 10 am

# Math 461, Sections B/C, Spring 2009
# HW Assignment 2, due Friday, 2/6/2009

## Instructions

- **Write your name on the cover sheet and staple the sheet to the assignment.** Do the problems in order, and make sure that each problem is clearly labelled. The assignment is due **in class** on the above due date. **Late homework, or homework dropped off in mailboxes, will not be accepted.** (You can, however, turn in the homework early, in my office, 241 Illini Hall, at any day before the due date.) If you cannot turn in an assignment on time, but have a legitimate excuse (e.g., illness), with appropriate documentation, the assignment will be marked as "excused"; see the Course Information Sheet handed out at the beginning of class for details.
- **Write-up:** Leave answers in raw/unevaluated form, such as $\frac{7!}{2!\cdot 3!2!}/2^7$; you will not get any additional credit for working out numerical answers. **Solutions, rather than answers, are expected for all problems; an answer alone (such as the above formula), is not sufficient—you need to indicate how you arrived at the various terms in this formula.** (See the class examples or the examples in the book for ways of providing appropriate explanations.)

## HW 2 Problems (pp. 55–60)

All of the problems below are from the problems section at the end of Chapter 2 (p. 55–60), and relate to material in Section 2.5 in the book and covered in class the week of 1/26. All problems involve probability calculations within an "equally likely outcome" model. This is the simplest type of probability model, with probabilities computed via the formula $P(E) = \#E/\#S$, where $S$ is the set of all outcomes, and $E$ the set of outcomes we're interested in. The probability calculation then reduces to two counting (i.e., combinatorial) problems, namely that of computing the number $\#S$ of all elements in $S$ (usually easy), and the number $\#E$ of elements in $E$ (harder). To compute $\#E$ and $\#S$, use the counting techniques developed in Chapter 1. In multipart problem, $S$ (and hence $\#S$) is usually the same for all parts, while $E$ depends on the particular question asked. Follow this procedure in working these problems, i.e., proceed as follows:

- First, clearly describe/identify $S$, the set of all outcomes. (e.g., "unordered samples of 6 from 52" or "poker hands", or "ordered arrangements without repetition"), then compute $\#S$.
- Next, for each particular question, describe/identify the set $E$ of outcomes corresponding to this question, and compute $\#E$, and get the probability $P(E)$ sought as the ratio of these two terms. *Make sure to provide some explanation of how you arrived at the formula for $\#E$.*

1. #15(a)(b)(c)(d)(e)
2. #16(a)(b)(c)(d)(e)(f)(g)
3. #18
4. #23
5. #28(a)(b) (first (i) without, then (ii) with replacement)
6. #35
7. #36(a)(b)
8. #37(a)(b)
9. #43(a)(b)
10. #44(a)(b)(c)
11. #52(a(b)
12. **Birthday simulation.** Last, but not least, a hands-on exercise: Find a computer (e.g., one of the machines in the math library), fire up a web browser, go to the course webpage, `http://www.math.uiuc.edu/~hildebr/461`, and run one of the two birthday applets linked from this page. Get a printout of the screen showing a birthday simulation, and attach that to the hw assignment as proof that you did it.