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

Math 461, Sections B/C, Spring 2009
HW Assignment 7, due Friday, 4/3/2009

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.
- **About this assignement.** This assignment is on material covered in class through Monday after the break. All but the last few problems (37–40) depend only on material covered before the break.

Hints and comments

- **Problems 1–6:** These are exercises using general formulas and properties of continuous r.v.'s, p.d.f.'s and c.d.f.'s. If necessary, review integration techniques from your calculus text; in particular, integration by parts is often needed in this context.
- **Problem 4(c):** This problem involves two stages, requiring different types of techniques. For the first stage, consider a single device, and compute the probability that it lasts at least 15 hours. For the second stage, treat the 6 devices as independent S/F trials.
- **Problems 15–26:** These are problems on the normal distribution and normal approximation to the binomial distribution. Use the table for $\Phi(x)$ given on p. 222 (rather than a calculator with a built-in $\Phi(x)$ function—in an exam you are limited to a table).
- **Problems 37-40:** These are "change of variables" problems. Use the technique illustrated in Example 7a (called the "distribution function technique", as is involves a detour via the associated c.d.f.'s).
- **Expectations involving absolute values, such as $E(|X-2|)$.** This is frequently a source of errors. To properly handle such expressions, first get rid of absolute values by considering separately the ranges where the expression inside the absolute value is positive and where it is negative; i.e., replace $|\dots|$ by $+(\dots)$ when $(\dots) \geq 0$, and by $-(\dots)$ when $(\dots) < 0$. For instance, $|X-2|$ equals $(X-2)$ if $X \geq 2$, and $-(X-2)$ if $X < 2$, so the integral $E(|X-2|) = \int_{-\infty}^{\infty} |x-2| f(x)dx$ splits into $\int_2^{\infty}(x-2)f(x)dx + \int_{-\infty}^{2}(-(x-2))f(x)dx$. (Also remember to restrict the integration to the range on which $f(x)$ "lives". For example, if f is an exponential density, then the latter integral should be restricted to and integral of the form $\int_0^2$.)

HW 7 Problems (Chapter 5, pp. 247–251)

1. #3 (Hint: Check properties of a p.d.f.)
2. #4(a)(b)(c)
3. #6 (a)(b)(c)
4. #11
5. #15 (a)(b) (skip the other parts)
6. #18
7. #19
8. #20(a)(b)(c)
9. #23
10. #26
11. #31
12. #32
13. #37
14. #39
15. #40