Assignment 8

Due Wednesday 11/7

Exam 2: The second exam will be Wednesday, November 14. It will cover all material treated in class through Wednesday, November 7. This should include Section 6.2 and possibly Section 6.3—details next week. There will be a set of **reveiw problems** and a **problem session**.

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

Chapter 5: P 23, 25*, 27, 29*, 40, 41

TE 20*, 28*, 29

Problem 29 does not appear in the fifth edition of the text; problems 40 and 41 correspond to 38 and 39, repectively, in the fifth edition.

8.A* Let X be a random variable having gamma distribution with parameters (α, λ), and let $Y = KX$ for some positive constant K. Show that Y also has gamma distibution, and identify the parameters of this distribution.

8.B* Let X be a random variable with density

$$f_X(x) = \begin{cases} c\,(2+x), & \text{if } -2 \le x \le 2, \\ 0, & \text{if } x < -1 \text{ or } x > 1. \end{cases}$$

(a) Find the constant c.

(b) Find the mean and variance, $E[X]$ and $\mathrm{Var}(X)$, of X.

(c) Find the cumulative density function F_X of X. *Be sure to specify $F_X(x)$ for all real numbers x.*

(d) Find the density f_Y of the random variable $Y = X^2$. *Be sure to specify $F_Y(y)$ for all real numbers y.*

*Problems marked with an asterisk, **including 8.A and 8.B**, will be collected and graded. Remember to *explain* how you arrive at your answers.

Hints and instructions:

P 23, 25, 27, 29. Use the normal approximation to the binomial distribution, with the half-integer (continuity) correction. In 29, note that if a stock has initial price s, and the price goes up X times in n time periods, then the final price is $u^X d^{n-X} s$.

P 40, 41, TE 28, 29. I suggest that you do not use Theorem 7.1 to do these problems. Rather, go through the procedure outlined in Section 7 and in class: find the cumulative distribution function of the random variable of interest, then differentiate it to obtain the density.