**IEOR 3106: Introduction to Operations Research: Stochastic Models**

**Fall 2012, Professor Whitt**

**Homework Assignment 9: Tuesday, November 13.**

**Due on Tuesday, November 20.**

**Chapter 7: Renewal Theory and its Applications**

In Ross, read Sections 7.1-7.3 up to, but not including, Example 7.8. Skip Remark (ii) in Section 7.2 and Examples 7.1 and 7.3. Also Read Section 7.4 up to, but not including, Example 7.13. (The total required reading is approximately 12 pages.)

Do the following exercises at the end of Chapter 7. You need not turn in problems with answers in the back.

1. Hint: See the beginning of Section 7.2.

2. Hint: See Sections 2.2.4 and 7.2. Recall that the sum of independent Poisson random variables has a Poisson distribution..

3. (answer in back) Hint: See Example 7.2 and following Remark (i).

4. Hint: To make this relatively easy, consider the special case of deterministic times between renewals.

7.

8. (answer in back) Hint: Look at Section 7.3.

21.

22. (answer in back) Hint: Look at Section 7.4.

23.

9. Hint: Let $T$ be the time it takes to complete a job. Let $W$ be the time it would take to complete the first job attempted. Let $S$ be the time of the first shock. To compute $E[T]$, develop an equation for it, by conditioning on the possible outcomes of $W$; i.e., compute $E[T]$ by computing $E[E[T|W]]$. To compute $E[T|W = w]$, compute $E[T|W = w, S = x]$, multiply by the density $f_S(x)$ and integrate over $x$. (We put Problem 9 last, because it seems a bit harder.)