Homework 7
Due: October 25, 2007, 3:50pm (end of class)

Reading: Textbook sections 5.3, 5.5 (pages 280-288, 293-303)

Problems from textbook:
1. Problem 5.18
2. Problem 5.24
3. Problem 5.26
4. Problem 5.29

Problem 1:
A factory produces $X_n$ gadgets on day $n$, where the $X_n$ are i.i.d. random variables with mean 5 and variance 9.

(a) Find an approximation to the probability that the total number of gadgets produced in 100 days is less than 440.

(b) Find (approximately) the largest value of $n$ such that

$$P(X_1 + X_2 + \cdots + X_n \geq 200 + 5n) \leq 0.05.$$ 

(c) Let $N$ be the first day on which the total number of gadgets produced exceeds 1,000. Calculate an approximation to the probability that $N \geq 220$.

Hint: A Q-function table can be found in the text (Table 3.3).