

Homework 08_3 (Due: 3/24)

1. A certain large city averages three murders per week and their occurrences follow a Poisson distribution.
 - (1) What is the probability that there will be five or more murders in a given week?
 - (2) On the average, how many weeks a year can this city expect to have no murders?
 - (3) How many weeks per year (average) can the city expect the number of murders per week to equal or exceed the average number per week?
2. Show that a geometric (p) random variable Y has CDF

$$F_Y(y) = \begin{cases} 1 - (1-p)^{\lfloor y \rfloor} & y \geq 1, \\ 0 & y < 1, \end{cases}$$

where $\lfloor y \rfloor$ is the largest integer less than or equal to y .

3. Prove Theorem 2.7 in the text.
4. A cellular phone costs \$25 per month with 45 minutes of use included and each additional minute of use costs \$0.40. If the number of minutes you use in a month is a geometric random variable M with expected value of

$$E[M] = 1/p = 45 \text{ minutes.}$$

- (1) What is the PMF of C , the cost of the phone for one month?
- (2) Express the monthly cost C as a function of M and calculate the expected monthly cost $E[C]$ using the functional relationship.

5. Text Problem 2.10.2
6. Text Problem 2.10.3