

## Dr. Z.'s Intro to Probability Homework assignment 9

1. The expected number of typos on a page that I post on my website is 1.5 per page. What is the probability that the next page I post will have (i) 0 typos (ii) 3 or more typos?

Explain!

2. The number of letters that I find in my mailbox, in any given day, has a Poisson distribution with mean 3. Today my wife told me that I got strictly more than two letters. What is the probability that I got at least four letters?

3. Compare the Poisson approximation with the correct binomial distribution for the following cases

(i)  $P[X = 1]$  when  $n = 30$  and  $p = .1$  ;

(ii)  $P[X = 1]$  when  $n = 40$  and  $p = .1$  .

4. The number of letters I get in any given day has a Poisson distribution with mean 1. The number of letters I get every day is independent of the number of letters I get in other days.

What is the probability that I will get more than 7 letters next week?

5. The number of days an employee is sick each month is modeled by a Poisson distribution with mean 1. The number of sick days in different months are mutually independent. Calculate the probability that an employee is sick more than two days in a three-months period.

6. An actuary discovers that policyholders are three times as likely to file two claims as to file four claims. If the number of claims filed has a Poisson distribution, what is the variance of the number of claims filed?

7. Let  $X$  represent the number of Email messages that you get before noon and let  $Y$  represent the number if Emails you get during the afternoon.

You are given

- $X$  and  $Y$  are Poisson distributed.
- The first moment of  $X$  is less than the first moment of  $Y$  by 2
- The second moment of  $X$  is 40% of the second moment of  $Y$ .

What is the probability that you will get strictly less than 2 Email messages tomorrow between midnight and noon?