

Quiz #3

Please, write clearly and justify all your steps, to get proper credit for your work.

(1) [4Pts] Suppose that the probability density function $f(x)$ of the length X of an international phone call, rounded up to the next minute, is given by:

x	1	2	3	4
$f(x)$	0.3	0.5	0.1	0.1

Calculate the mean and the variance.

$$E[x] = \sum_{i=1}^4 x f(x) = 0.3 + 2 * 0.5 + 3 * 0.1 + 4 * 0.1 = 2$$

$$\begin{aligned} \text{var}(X) &= E[X^2] - E[X]^2 = \sum_{i=1}^4 x^2 f(x) - 4 \\ &= 0.3 + 4 * 0.5 + 9 * 0.1 + 16 * 0.1 - 4 = 4.8 - 4 = 0.8 \end{aligned}$$

(2) [2Pts] A job applicant to a company is required to submit one, two, three, four, or five forms depending on the nature of the job. Let X to denote the number of forms required of an applicant. The probability that x forms are required is known to be proportional to x , that is,

$$p(x) = kx, \text{ for } x = 1, 2, 3.$$

Calculate the value k so that $p(x)$ is a probability mass function.

$$1 = \sum_{x=1}^3 kx = k + 2k + 3k = 6k$$

$$\text{Thus, } k = \frac{1}{6}$$