Math 3339   Name:

HW #3

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

(1)[8 Pts] 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
$f(x)$	0.2	0.5	0.2	0.1

(a) Calculate $P(X \leq 2)$, $P(X < 2)$, and $P(X \geq 1)$.
(b) Plot the cumulative distribution function $F(x)$.
(c) Calculate the mean $\mu = E(X)$.
(d) Calculate $E(X^2)$ and us it to compute the variance σ^2.

(2)[8 Pts] 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,

$$p(x) = k\,x, \ \text{for } x = 1, 2, \ldots, 5.$$

(a) Calculate the value k so that $p(x)$ is a probability mass function.
(b) What is the probability that at least 2 forms are needed?
(c) What is the probability that at most 2 forms are needed?
(d) Calculate $E(X^2)$ and us it to compute the variance σ^2.

(3)[10 Pts] This problem requires R: follow the instruction on the class webpage to install Rstudio. Using the data of Problem (1), use R to do the following.

(a) Plot the probability mass function. Remember to label the x and y axes.
(b) Verify that the values of the probability add up to 1.
(c) Plot the cumulative distribution function. Remember to label the x and y axes.
    Please, print your plots and your R scripts.