1. Let X be a random variable with support $=\{0, 1, 2, 3\}$.

   (a) Fill in the blank in the table below to make it a valid probability mass function:

x	0	1	2	3
$P_X(x)$	0.5	0.25	0.1	?

   (b) Derive the cumulative distribution function for X.

   Determine the probabilities that:

   (c) X is at least 2.

   (d) X is neither 0 nor 2.

   (e) X is non-negative.

   (f) Find the expected value of X.

   (g) Find the variance of X.

2. Let X be a random variable with the following distribution with probability function

$$f(x) = \begin{cases} \frac{c}{x} & x = 1, 2, 3, 4 \\ \\ 0 & o.w. \end{cases}$$

where c is a constant.

(a) Find the value of c that makes $f(x)$ a valid probability function.

(b) Find the value of $E(X)$.

(c) Find the value of σ^2 for this random variable.

3. Let X be a random variable following a binomial distribution with probability function

$$f(x) = \frac{4!}{x!(4-x)!}(0.6)^x(0.4)^{4-x}$$

. Complete the probability table for X and find the mean and CDF of X.

x	$P(X = x)$
0	
1	
2	
3	
4	