Discrete Random Variables

1. The probability distribution of discrete random variable X is tabulated below. There are 6 possible outcome of X, i.e. 0, 1, 2, 4 ,8 and 10.

x_i	0	1	2	4	8	10
$P(x_i)$	0.25	0.15	0.25	0.15	k	0.10

   i. (1 marks) Compute the value for k.

   ii. (3 marks) Determine the expected value $E(X)$.

   iii. (2 marks) Evaluate $E(X^2)$.

   iv. (3 marks) Compute the variance of random variable X.

2. Suppose X is a random variable with

   - $E(X^2) = 3.6$
   - $P(X = 2) = 0.6$
   - $P(X = 3) = 0.1$

   (a) The random variable takes just one other value besides 2 and 3. This value is greater than 0. What is this value?

   (b) What is the variance of X?

3. Consider the random variables X and Y. Both X and Y take the values 0, 1 and 2. The joint probabilities for each pair are given by the following table.

	$X = 0$	$X = 1$	$X = 2$
$Y = 0$	0.1	0.15	0.1
$Y = 1$	0.1	0.1	0.1
$Y = 2$	0.2	0.05	0.1

   Compute the $E(U)$ expected value of U, where $U = X - Y$.