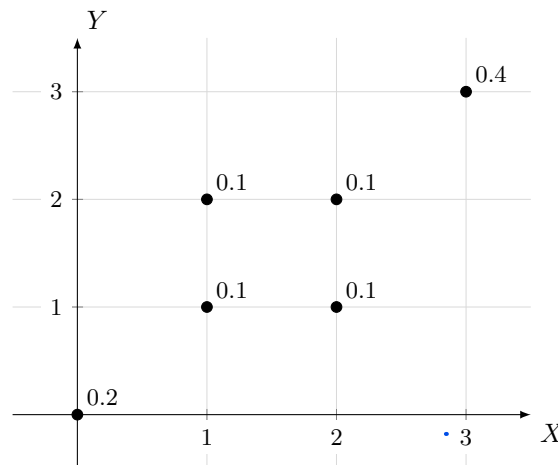1. For the discrete random variables X and Y with the joint distribution shown in figure below:

Determine

i) $E(X+Y)$

    A) 1.8   B) 3.6   C) 1.2   D) 2.4

ii) $E(XY)$

    A) 4.5   B) 1.0   C) 1.2   D) 3.5

iii) $Var(X+Y)$

    A) 12.96   B) 18.2   C) 4.56   D) 5.24

iv) $Var(XY)$

    A) 20.25   B) 34.9   C) 14.65   D) 3.83

2. A group of N people throw their hats into the center of a room. The hats are mixed up, and each person randomly selects one. Let X be the number of people that select their own hats. Find $E(X)$.

    A) $E(X) = 1$ B) $E(X) = 2$ C) $E(X) = 3$ D) $E(X) = 4$

3. An unknown distribution has a mean of 90 and a standard deviation of 15. Samples of size $n = 25$ are drawn randomly from the population. Find the probability that the sample mean is between 85 and 92.

    A) 0.7475   B) 0.6997   C) 0.9522   D) 0.4778

4. If 10 fair dice are rolled, find the approximate probability that the sum obtained is between 30 and 40.

    A) 0.65   B) 0.825   C) 0.73   D) 0.56

5. Let $X_i, i = 1, \cdots 10$ be independent random variables, each uniformly distributed over $(0, 1)$ where the mean $E(X_i) = \frac{1}{2}$ and the variance $Var(E_i) = \frac{1}{12}$. Calculate an approximation to

$$P\left(\sum_{i=1}^{10} X_i > 6\right)$$

A) 0.26   B) 0.75   C) 0.84   D) 0.16

6. The number of students that enroll in a computer science course is a Poisson random variable with mean 100. The professor in charge of the course has decided that if the number enrolling is 120 or more he will teach the course in two separate sections, whereas if fewer than 120 students enroll he will teach all of the students together in a single section. What is the probability that the professor will have to teach two sections? (Hint: For Poisson distribution, the mean and the variance are equal)

     A) 0.9772   B) 0.0228   C) 0.4886   D) 0.0456

7. An electronic company manufactures resistors that have a mean resistance of 100 ohms and a standard deviation of 10 ohms. The distribution of resistance is normal. Find the probability that a random sample of $n = 25$ resistors will have an average resistance of fewer than 95 ohms.

     A) 0.9938   B) 0.5642   C) 0.0062   D) 0.3541