Q1. Prove the Vandermonde's identity:



Q2. Three bags contain 8 red, 8 black; 10 red, 12 black, and 6 red & 9 black balls respectively. A bag is selected at random. A ball is then drawn from it. If the ball drawn is red, find the probability that it is drawn from the third bag.

Q3. Write down the essential properties of Variance and Expected Value.

Q4. Proove Var(aX)=a2Var(X)

Q5. Prove: Var(X)= E[X2]-(E[X])2

Q6. Compute the final expressions for the expected value and variance for the following distributions:

1. Bernoulli
2. Binomial
3. Normal
4. Exponential
5. Poisson