RAVI MATHS TUITION CENTER, NEAR VILLIVAKKAM RLY STATION, CHENNAI – 82.
WHATSAPP - 8056206308

Probability Distributions

12th Standard

Maths

Exam Time : 02:00:00 Hrs | Total Marks : 75

25 x 3 = 75

1) In a pack of 52 playing cards, two cards are drawn at random simultaneously. If the number of black cards drawn is a random variable, find the values of the random variable and number of points in its inverse images.
2) A six sided die is marked '2' on one face, '3' on two ofits faces, and '4' on remaining three faces. The die is thrown twice. If X denotes the total score in two throws, find the values of the random variable and number of points in its inverse images.
3) The probability density function of X is

$$f(x)=\begin{cases} x & 0<x<1 \\ 2-x & 1\le x<2 \\ 0 & \text{otherwise} \end{cases}$$

Find P(0.2≤X< 0.6)
4) The probability density function of X is

$$f(x)=\begin{cases} x & 0<x<1 \\ 2-x & 1\le x<2 \\ 0 & \text{otherwise} \end{cases}$$

find P(0.5≤X< 1.5)
5) For the random variable X with the given probability mass function as below, find the mean and variance \(f(x)=\begin{cases} \begin{matrix} 2(x-1) & 1
6) Two balls are drawn in succession without replacement from an urn containing four red balls and three black balls. Let X be the possible outcomes drawing red balls. Find the probability mass function and mean for X.
7) Four fair coins are tossed once. Find the probability mass function, mean and variance for number of heads occurred.
8) A lottery with 600 tickets gives one prize of Rs.200, four prizes of noo, and six prizes of Rs. 50. If the ticket costs is Rs.2, find the expected winning amount of a ticket
9) Using binomial distribution find the mean and variance of X for the following experiments
   (i) A fair coin is tossed 100 times, and X denote the number of heads.
   (ii) A fair die is tossed 240 times, and X denote the number of times that four appeared.
10) If X- B(n, p) such that 4P(X = 4) = P(X = 2) and n = 6 • Find the distribution, mean and standard deviation of X.
11) Suppose a pair of unbiased dice is rolled once. If X denotes the total score of two dice, write down
   (i) the sample space
   (ii) the values taken by the random variable X,
   (iii) the inverse image of 10, and
   (iv) the number of elements in inverse image of X.
12) Two fair coins are tossed simultaneously (equivalent to a fair coin is tossed twice). Find the probability mass function for number of heads occurred.

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13) Find the probability mass function f (x) of the discrete random variable X whose cumulative distribution function F(x) is given by

$$F(x)=\begin{cases}0 & -\infty<x<-2\\ 0.25 & -2\le x<-1\\ 0.60 & -1\le x<0\\ 0.90 & 0\le x<1\\ 1 & 1\le x<\infty\end{cases}$$

Also find (i) P(X < 0) and (ii)$P(X \geq -1$

14) Find the mean and variance of a random variable X , whose probability density function is $f(x)=\begin{cases}\lambda e^{-2x} & for \geq 0\\ 0 & otherwise\end{cases}$

15) Give any three properties on expectation and variance.

16) Two cards are drawn successively without replacement from a well shuffled pack of 52 cards. Find the probability distribution of number of spades.

17) Four defective oranges are accidentally mixed with sixteen good ones. Three oranges are drawn from the mixed lot. Find the probability distribution of X, the number of defective oranges.

18) Two cards are drawn simultaneously from a well shuffled pack of 52 cards. Find the probability distribution of number of jacks.

19) Find the mean, variance and standard deviation of the number of heads in two tosses of a coin

20) In 3 trials of a binomial distribution, the probability of 2 success is 9 times the probability of 3 success. Find the parameter of p of the distribution.

21) How many times must a man toss a coin so that the probability of having atleast one head is more than 80%?

22) If the mean and variance of a binomial distribution are respectively 9 and 6, find the distribution.

23) Consider a random variable X with p.d.$f(x)=\begin{cases}3x^2, 0<x<1\\ 0, otherwise\end{cases}$ Find Var(3X – 2).

24) A person tosses a coin and is to receive Rs.4 for a head and has to pay Rs.2 for a tail. Find the variance of the game.

25) Let X be a continuous random variable with $f(x)=\begin{cases}\frac{2}{x^4}, x\geq 1\\ 0, otherwise\end{cases}$ Find the mean and the variance of X.

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