SRM Institute of Science and Technology

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Department of Mathematics

21MAB301T-Probability and Statistics

Sl.No.	Tutorial Sheet-1	Answers
1	X: 1, 2, 3, 4, 5 / P[X=x]: k, $2k$, $3k$, $4k$, $5k$. Find (i) the value of k,(ii) $P(X<4)$	$k=1/15$, 6/15
2	X: 0, 1, 2, 3, 4, 5, 6, 7, 8 / P[X=x]: k, $3k$, $5k$, $7k$, $9k$, $11k$, $13k$, $15k$, $16k$. Find (i) the value of k,(ii) the Distribution Function (CDF) (iii) $P(0<X<3/X>2)$ and (iv) the smallest value of α for which $P(X\leq\alpha)>\frac{1}{2}$.	$k=1/80$, CDF, $0,\alpha=6$
3.	The probability density function (PDF) of a random variable X is given by $f(x)=kx(1-x),0<x<1$,Find k and a such that $P([X<a])=P([X>a])$.	$k=6$,1/2
4.	The probability density function (PDF) of a random variable X is given by $f(x)=kxe^{-x},x>0$,Find k and CDF of X	$k=1,F(x)=1-(x+1)e^{-x},x>0$
5	X: -2, -1, 0, 1, 2, 3 / P[X=x]: 0.1, k, 0.2, $2k$, 0.3, $3k$. Find (i) the value of k,(ii) the Distribution Function (CDF)	$k=1/15$, CDF
6	X: 0, 1, 2, 3, 4, 5, 6, 7, 8 / P[X=x]: k, $3k$, $5k$, $7k$, $9k$, $11k$, $13k$, $15k$, $16k$. Find (i) the value of k,(ii) the Distribution Function (CDF) (iii) $P(0<X<3/X>2)$ and (iv) the smallest value of α for which $P(X\leq\alpha)>\frac{1}{2}$.	$k=1/80$, CDF, $0,\alpha=6$
7	A random variable X has the following distribution: X: 0, 1, 2, 3, 4, 5, 6, 7 / P[X=x]: 0, k, $2k$, $2k$, $3k$, k^2, $2k^2$, $7k^2+k$. Find (i) the value of k,(ii) the Cumulative Distribution Function (CDF) (iii) $P(1.5<X<4.5/X>2)$ and (iv) the smallest value of α for which $P(X\leq\alpha)>1/2$	$k=1/10$, 0.10,CDF,5/7, 4
8	Find the value of k for the pdf $f(x)=\begin{cases}kx, & \text{when } 0\leq x\leq 1\\ k, & \text{when } 1\leq x\leq 2\\ 3k-kx, & \text{when } 2\leq x\leq 3\\ 0, & \text{otherwise}\end{cases}$. Also find (a) the CDF of X (b) $P(1.5<X<3.2/0.5<X<1.8)$	$k=1/2$, CDF= $F(x)=\begin{cases}0 & x<0\\ x^2/2, & 0\leq x\leq 1\\ (2x-1)/4, & 1\leq x\leq 2\\ (-x^2+6x-5)/4, & 2\leq x\leq 3\\ 1, & x\geq 3\end{cases}$, 16/20
9	The cumulative distribution function (CDF) of a random variable X is given by $F(x)=\begin{cases}1-k/x^2, & \text{when } x>2\\ 0, & \text{otherwise.}\end{cases}$ Find k and the (i) pdf of X,(ii) $P(X>1/X<5)$.	$k=4$, $f(x)=8/x,x>2$, 1
10	The probability density function (PDF) of a random variable X is given by $f(x)=kx^4,-1<x<0$Find k and $P([X>-1/2]/[X<-1/4])$.	$k=5$,1/33 =0.0303