SRM Institute of Science and Technology College of Engineering and Technology, Kattankulathur

Department of Mathematics

21MAB301T-Probability and Statistics

Hands on Practice problems:

To be submitted on or before 15.02.2024

1. A chain of stores sells three different brands of TVs. Of its TV sales, 50% are brand-1 (the least expensive), 30% are brand-2, and 20% are brand-3. Each manufacturer offers a 1-year warranty on parts and labor. It is known that 25% of brand- 1's TVs require warranty repair work, whereas the corresponding percentages for brands 2 and 3 are 20% and 10%, respectively. (i) What is the probability that a randomly selected purchaser has a TV that will need repair while under warranty? (ii) If a customer returns to the store with a TV that needs warranty repair work, what is the probability that it is a brand-3 TV?
2. 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 $P([X < a]) = P([X > a])$.
3.

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 $P(X \leq \alpha) > \frac{1}{2}$.

4. Find the following from the table given

X	-1	0	1	2
$P[X=x]$	0.3	0.1	0.4	0.2

$E(X)$, $E(X^2)$, $Var(X)$, $E(2X+1)$, $Var(2X+1)$.

5. For the pdf $f(x) = \begin{cases} x, & \text{when } 0 \leq x \leq 1 \\ 2-x, & \text{when } 1 \leq x \leq 2 \\ 0, & \text{otherwise} \end{cases}$. Find (a) MGF of X (b) Mean and Variance of X