SRM Institute of Science and Technology

College of Engineering and Technology

Kattankulathur-603 203

Department of Mathematics

21MAB301T-Probability and Statistics

Sl.No.	Tutorial Sheet-1	Answers
1	<table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>P[X=x]</td><td>k</td><td>$4k$</td><td>$6k$</td><td>$4k$</td><td>k</td></tr></table> Find the MGF and hence mean and variance.	$k = 1/16,\ M_X(t) = 1/16\{1 + 4e^t + 6e^{2t} + 4e^{3t}$ $E(X) = 2, Var(X) = 1$
2	If $P(X = x) = 1/2^x, x = 1, 2, 3, \ldots$, find the MGF.	$e^t/(2 - e^t)$
3	The probability density function (PDF) of a random variable X is given by $f(x) = k(1 - x), 0 < x < 1$,Find the r^{th} moment about origin and hence find the mean and variance.	$\mu_r' = 1/(r + 1)(r + 2)$,1/3,1/18
4	The probability density function (PDF) of a random variable X is given by $f(x) = (1/100)xe^{-x/10}, x > 0$,Find $E(X), Var(X)$	20, 200
5	<table><tr><td>X</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>$P[X = x]$</td><td>0.3</td><td>0.1</td><td>0.4</td><td>0.2</td></tr></table> $E(X),\ E(X^2),\ Var(X),\ E(2X + 1),\ Var(2X + 1)$.	0.5, 1.5, 1.25, 2, 5
6	<table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>P[X=x]</td><td>0.08</td><td>0.12</td><td>0.19</td><td>0.24</td><td>0.16</td><td>0.10</td><td>0.07</td><td>0.04</td></tr></table> Find the mean and variance.	4.06, 3.2164
7	A random variable X has the pdf $f(x) = kx^2e^{-x},\ x \geq 0$. Find the r^{th} moment and hence find the first four moments.	$(1/2)(r + 2)!$, 3, 12, 60,360
8	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	$M_X(t) = (1/t^2)[e^t - 1]^2, t \neq 0$, 1, 1/6.
9	Find the MGF and hence mean and variance of $(1/2)e^{-\lvert x\rvert}, -\infty < x < \infty$ 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 first four moments about $X = 4$ are 1,4,10 and 45. Find the mean, variance, μ_3 and μ_4.	5,3,0,26