

Jaypee University of Engineering & Technology, Guna
Probability Theory and Random Process (MA106)
Tutorial-3a (Continuous one variable)

Q1. If pdf of a random variable X is given by

$$f(x) = \begin{cases} \frac{1}{4}, & -2 < x < 2 \\ 0, & \text{elsewhere} \end{cases}$$

Find $P\{|X| > 1\}$.

Q2. Find the value of k, if

$$f(x) = \begin{cases} kxe^x, & x \leq 0 \\ 0, & \text{elsewhere} \end{cases} \quad \text{is the pdf of a random variable}$$

Q3. The probability distribution of a RV X is given below:

x	:	-2	-1	0	1	2	3
$P(x)$:	0.1	k	0.2	$2k$	0.3	$3k$

Find $Y = X^2 + 2X$, find the probability distribution, mean and variance of Y.

Q4. In a continuous distribution, the probability density is given by

$$f(x) = kx(2 - x), 0 < x < 2$$

Find k, mean, variance and distribution function.

Q5. If the density of a continuous RV X is given by

$$f(x) = \begin{cases} ax, & 0 \leq x \leq 1 \\ a, & 1 \leq x \leq 2 \\ 3a - ax, & 2 \leq x \leq 3 \\ 0, & \text{elsewhere} \end{cases}$$

(i) Find the value of a

(ii) Find cdf of X

Q6. A continuous RV X that can assume any value between $x = 2$ and $x = 5$ has a density function given by $f(x) = k(1 + x)$. Find $P(X < 4)$.

Q7. A continuous RV X has a pdf $f(x) = kx^2e^{-x}, x \geq 0$. Find k, mean and variance.