All Branches   Hinglish

Subject: Engineering Mathematics | DPP-05 |
Chapter : Probability
Topic : Discrete Random Variable

1. The number of parameters in the univariate exponential and Gaussian distributions, respectively are
   (a) 2 and 2   (c) 2 and 1
   (b) 1 and 2   (d) 1 and 1

2. For the function f(x) = a + bx, 0 < x < 1, to be a valid probability density function, which one of the following statements is correct?
   (a) a = 1, b = 4   (c) a = 0, b = 1
   (b) a = 0.5, b = 1   (d) a = 1, b = -1

3. If f(x) and g(x) are two probability density functions.

$$f(x)=\begin{cases} \dfrac{x}{a}+1: & -a\le x<0 \\[2mm] -\dfrac{x}{a}+1: & 0\le x\le a \end{cases}$$

$$g(x)=\begin{cases} -\dfrac{x}{a}: & -a\le x<0 \\[2mm] \dfrac{x}{a}: & 0\le x\le a \\[2mm] 0 & \text{otherwise} \end{cases}$$

   Which of the following statement is true?
   (a) Mean of f(x) and g(x) are same; Variance of f(x) and g(x) are same
   (b) Mean of f(x) and g(x) are same; Variance of f(x) and g(x) are different
   (c) Mean of f(x) and g(x) are different; Variance of f(x) and g(x) are same
   (d) Mean of f(x) and g(x) are different; Variance of f(x) and g(x) are different

4. Probability density function of a random variable x is given below

$$f(x)=\begin{cases} 0.25 & if\ 1\le x\le 5 \\ 0 & \text{otherwise} \end{cases}$$

   $P(X \le 4)$ is

5. Given that x is a random variable in range $[0, \infty]$ with a probability density function $(e^{-x/2})/K$, the value of the constant K is_____.

6. Suppose you break a stick of unit length at a point chosen uniformly at random. Then the expected length of the shorter stick is _____ .

7. Among the four normal distributions with probability density function as shown below, which one has the least density and the lowest variance?

   (a) I   (c) III
   (b) II   (d) IV
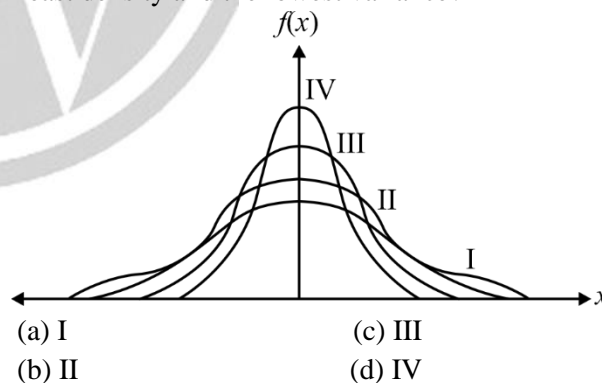
8. A simple random sample of 100 observations was taken from a large population. The sample mean and the standard deviation were determined to be 80 and 12 respectively. The standards error of mean is _____.

9. The standard normal probability function can be approximated as

$$F(X_n) = \dfrac{1}{1+\exp\left(-1.7255 X_n \left| X_N \right|^{0.12}\right)}$$

where X_n = standard normal deviate. If mean and standard deviation of annual precipitation are 102 cm and 27 cm respectively, the probability that the annual precipitation will be between 90 cm and 102 cm is

(a) 66.7%   (c) 33.3%

(b) 50.0%   (d) 16.7%

10. $P_X(X) = Me^{(-2|X|)} + Ne^{(-3|X|)}$ is the probability density function for the real random variable X, over the entire x-axis, M and N are both positive real numbers. The equation relating M and N is

(a) $M + \dfrac{2}{3}N = 1$

(c) $M + N = 1$

(b) $2M + \dfrac{1}{3}N = 1$

(d) $M + N = 3$

Answer Key

1. (b)
2. (b)
3. (b)
4. (0.75)
5. (2)

6. (0.25)
7. (d)
8. (1.2)
9. (d)
10. (a)

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