Assignment 11

The due date for submitting this assignment has passed.
Due on 2020-12-02, 23:59 IST.

1) The $k$th moment of a discrete r.v. $X$ is given by,

$$E[X^k] = (0.8)^k$$

for $k = 1, 2, \ldots$. The values of $P[X = 0]$ and $P[X = 1]$ are _____ and ________, respectively.

- 0.2, 0.8
- 0.3, 0.7
- 0.8, 0.2
- 0.5, 0.5

No, the answer is incorrect.
Score: 0
Accepted Answers: 0.2, 0.8

2) Let $Y = 2X + 3$. If $M_X(t)$ and $M_Y(t)$ are the moment generating functions of $X$ and $Y$, respectively, then, $M_Y(t)$ is________

$$e^{3t}M_X(2t)$$
$$e^{2t}M_X(2t)$$
$$e^{-2t}M_X(3t)$$
$$e^{2t}M_X(3t)$$

No, the answer is incorrect.
Score: 0
Accepted Answers: $e^{3t}M_X(2t)$

3) The random variables $X$ takes values $x_1 = -1$ and $x_2 = 1$ with probabilities $\frac{1}{2}$ each. The characteristic function of $X$ is____

$$\sin \omega$$
$$\cos \omega$$
$$e^{0.5\omega}$$
$$e^{-0.5\omega}$$

No, the answer is incorrect.
Score: 0
Accepted Answers: $\cos \omega$

4) The moment generating function of a Cauchy random variable with unit parameter ______

- is $\exp -t$
- is $\exp t$
- is $\frac{1}{2} \tan^{-1} t$

No, the answer is incorrect.
Score: 0
1) No, the answer is incorrect. Score: 0
Accepted Answers: does not exist

2) No, the answer is incorrect. Score: 0
Accepted Answers: does not exist

3) Week 12
Download Videos
Live session

4) 5) A random variable $X$ has mean 3 and variance 2. What is the upper bound on $P(|X - 3| \geq 2)$?

1 point

- $\frac{1}{5}$
- $\frac{1}{4}$
- $\frac{1}{3}$
- $\frac{1}{2}$

No, the answer is incorrect. Score: 0
Accepted Answers: $\frac{1}{2}$

6) The characteristic function of a Cauchy random variable with unit parameter is 

1 point

- $\exp(-t)$
- $\exp(t)$
- $\exp(\frac{1}{t})$
- $\frac{1}{2}\tan^{-1}t$

No, the answer is incorrect. Score: 0
Accepted Answers: $\exp(-t)$

7) $X$, $Y$ and $Z$ are random variables such that $X = U(Y + Z)$, where $U$ is a uniform random variable on [0, 1], $Y$ and $Z$ are independent of $U$ and of one another. If $X$, $Y$ and $Z$ are identical, what could be their distribution?

1 point

- Uniform
- Exponential
- Normal
- Gamma

No, the answer is incorrect. Score: 0
Accepted Answers: Exponential

8) Let $X$ have MGF $M(t)$ and define, $\psi(t) = \log M(t)$. The value of $\psi^{-1}(0)$ is

1 point

- $E[X]$
- $\text{var}(X)$
- $E[X^2]$
- $E[X^3]$

No, the answer is incorrect. Score: 0
Accepted Answers: $\text{var}(X)$

9) Which of the following is not a property of the characteristic function?

1 point

- Characteristic function is bounded
- Characteristic function of sum of independent random variables is the product of the characteristic function of the individual random variables
- Two random variables can have the same distribution if and only if their characteristic functions are identical
- Characteristic function of a symmetric random variable is real-value and odd

No, the answer is incorrect. Score: 0
Accepted Answers: Characteristic function of a symmetric random variable is real-value and odd

10) Let $X$ and $Y$ be independent $\chi^2(0, 1)$ random variables. Let $U$ and $V$ be independent of $X$ and $Y$. The distribution of $Z = \frac{UX + VY}{\sqrt{U^2 + V^2}}$ is

1 point

- Uniform
- Exponential
- Normal
- Gamma

No, the answer is incorrect. Score: 0
Accepted Answers: Uniform
11) \( X_1, X_2, \ldots, X_n \) are independent and identically distributed exponential random variables each having mean \( \frac{1}{\lambda} \). Distribution of \( \sum_{i=1}^{n} X_i \) is

- Uniform on \([0, 1]\)
- \( \exp(1) \)
- \( \mathcal{N}(0, 1) \)
- \( \Gamma(1, 1) \)

No, the answer is incorrect.
Score: 0
Accepted Answers: \( \mathcal{N}(0, 1) \)