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reviewer4@nptel.iitm.ac.in ▼

Courses » Probability and Statistics

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Unit 9 - Week 7

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Course outline

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● Lecture 41: Additive Properties of Distributions - I

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Week 8

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-03-20, 23:59 IST

1) 1 point
Let (X_1, X_2) have a uniform distribution on a triangular region with the joint density

$$f(x_1, x_2) = \begin{cases} 2, & 0 \leq x_1 \leq x_2 \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

Let $U = \frac{X_1}{X_2}$. Find $P\left(\frac{1}{2} \leq U \leq \frac{3}{2}\right)$.

- a. $\frac{1}{2}$
- b. $\frac{1}{3}$
- c. $\frac{1}{4}$
- d. $\frac{1}{5}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.
Score: 0

Accepted Answers:

a.

2) 1 point

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Week 12

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Assignment
Solution

Let (X, Y) be jointly distributed continuous random variables with the joint density

$$f(x, y) = \begin{cases} x + y, & 0 < x < 1, 0 < y < 1 \\ 0, & \text{otherwise} \end{cases}$$

Let $U = XY$. Find $\text{Var}(U)$.

- a. $\frac{1}{9}$
- b. $\frac{1}{18}$
- c. $\frac{1}{36}$
- d. $\frac{1}{54}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

3)

1 point

Let X and Y be independent random variables each with an exponential distribution parameter λ . Let $U = \frac{Y}{X+Y}$. Find $E(U^2)$.

- a. $\frac{1}{2}$
- b. $\frac{1}{3}$
- c. $\frac{1}{4}$
- d. $\frac{1}{5}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

4)

1 point

Let (X, Y) be jointly distributed continuous random variables with the joint density

$$f(x, y) = \begin{cases} 2e^{-x-2y}, & x > 0, y > 0 \\ 0, & \text{otherwise} \end{cases}.$$

Let $U = X + Y$. Find $E(U)$.

- a. $\frac{1}{2}$
- b. $\frac{1}{3}$
- c. $\frac{3}{2}$
- d. $\frac{3}{5}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

5)

1 point

Let X_1, \dots, X_5 be an independent identical distributed random sample from an exponential distribution with mean 9. Consider $X_{(1)} = \min(X_1, \dots, X_5)$ then find $P(X_{(1)} > 7 | X_{(1)} > 4)$.

- a. $e^{-\frac{1}{9}}$
- b. $e^{-\frac{1}{15}}$
- c. $e^{-\frac{3}{5}}$
- d. $e^{-\frac{5}{3}}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

d.

6)

1 point

Let X and Y be an independent continuous random variables with respective densities

$$f(x) = \frac{1}{\pi\sqrt{1-x^2}}, \quad -1 < x < 1 \quad \text{and} \quad f(y) = 2ye^{-y^2}, \quad 0 < y < \infty.$$

Find $E(XY)$.

- a. 0
- b. 1
- c. 2
- d. 3

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

7)

1 point

Let X_1, X_2, X_3 be independent and identically distributed random variables with the probability mass function

$$P(X = k) = \frac{1}{3} \left(\frac{2}{3} \right)^{k-1}, \quad k = 1, 2, \dots$$

Find $P(X_{(3)} = 2)$.

- a. $\frac{68}{729}$
- b. $\frac{29}{729}$
- c. $\frac{98}{729}$
- d. $\frac{71}{729}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

8)

1 point

Let X_1, X_2, X_3, X_4 and X_5 be independent and identically distributed random variables with common density

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

Let $Y = X_{(3)}$ be a third order statistic with density of the form

$$g(y) = Ay^B(1-y)^C, \quad 0 < y < 1.$$

Then Find the value of A, B and C .

- a. 15, 2 and 3
- b. 15, 2 and 2
- c. 30, 2 and 3
- d. 30, 2 and 2

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

d.

9)

1 point

Let X_1, X_2, X_3 and X_4 be independent and identically distributed random variables with density

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

Let $Y_i = -\log(X_i)$, $i = 1, 2, 3, 4$. Find $E(\bar{Y})$.

- a. 1
- b. 2
- c. 3
- d. 4

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

10)

1 point

Let X_1, \dots, X_{10} be independent and identically standard normal random variables. Let $Z = \sum_{i=1}^{10} X_i^2$.

Then $\text{Var}(Z)$ is

- a. 10
- b. 15
- c. 20
- d. 25

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

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