Unit 10 - Week 9

Assignment 9

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

Due on 2020-04-01, 23:59 IST.

$X_{(k)}$ represents the k^{th} order statistic throughout this tutorial sheet

1) Let $X_1, X_2, ...X_{10}$ be 10 independent samples taken from $U(0,1)$ distribution. What is the expectation of $X_{(2)}$? *1 point*

- 1/10
- 2/10
- 1/11
- 2/11

No, the answer is incorrect.
Score: 0
Accepted Answers:
2/11

2) Let $X_1, X_2, ...X_{10}$ be 10 independent samples taken from $U(0,1)$ distribution. What is the variance of $X_{(1)}$? *1 point*

- 0.008
- 0.015
- 0.0069
- 0.0909

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.0069

3) Let $X_1, X_2, ...X_{10}$ be 10 independent samples taken from $Exp(1)$ distribution. What is the expectation of $X_{(1)}$? *1 point*

- 10
- 0.1
- 5
- 1

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.1

4) Let $X_1, X_2, ...X_n$ be n independent samples taken from $Exp(1)$ distribution. What is the expectation of $X_{(r+1)} - X_{(r)}$ for any valid r? *0 points*

- r+1
- r
- n-r
- n-r-1

No, the answer is incorrect.
Score: 0
Accepted Answers:
n-r

5) Let $X_1, X_2, ...X_n$ be n independent samples taken from $Exp(\lambda)$ distribution. Which of the following statements are True? *1 point*

- $X_{(1)}$ and $X_{(2)}$ are independent
- $X_{(r)}$ and $X_{(r+1)} - X_{(r)}$ are independent
- $X_{(3)} - X_{(1)}$ and $X_{(5)} - X_{(4)}$ are independent
- $X_{(r+1)} - X_{(r)}$ is distributed as $Exp(\lambda(n-r))$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$X_{(r)}$ and $X_{(r+1)} - X_{(r)}$ are independent
$X_{(3)} - X_{(1)}$ and $X_{(5)} - X_{(4)}$ are independent
$X_{(r+1)} - X_{(r)}$ is distributed as $Exp(\lambda(n-r))$

6) Let $X_1, X_2, ...X_n$ be n independent samples taken from U(0,1) distribution, then find the distribution followed by the k^{th} order statistic $X_{(k)}$? *1 point*

- Beta2(k,n-k+1)
- Beta1(k,n-k+1)
- Beta2(n-k+1,k)
- Beta1(n-k+1,k)

No, the answer is incorrect.
Score: 0
Accepted Answers:
Beta1(k,n-k+1)

7) Let X_1, X_2, X_3 be a random sample from a continuous distribution having the pdf f(x)=2x, 0<x<1 and zero elsewhere. Compute the probability that the smallest of X_1, X_2, X_3 exceeds the median of the distribution. *1 point*

- 1/8
- 1/4
- 1/2
- 1/6

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/8

Please follow the below paragraph to answer the following set of questions (Question 8, 9 and 10)
Let $Y_1 \le Y_2 \le Y_3 \le Y_4$ be the order statistics of a random sample of size n = 4 from a distribution with pdf f(x) = 2x, 0 < x < 1 and zero elsewhere. Answer the following questions.

8) Find the joint pdf of Y_3 and Y_4 *1 point*

- $16y_3^4 y_4$ for $0 < y_3 \le y_4 < 1$
- $48y_3^5 y_4$ for $0 < y_3 \le y_4 < 1$
- $64y_3^2 y_4$ for $0 < y_3 \le y_4 < 1$
- $8y_3^3 y_4$ for $0 < y_3 \le y_4 < 1$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$48y_3^5 y_4$ for $0 < y_3 \le y_4 < 1$

9) Find the conditional pdf of Y_3, given $Y_4 = y_4$ *1 point*

- $\frac{3y_3^4}{y_4^4}$ for $0 < y_3 \le y_4$
- $\frac{4y_3^5}{y_4^4}$ for $0 < y_3 \le y_4$
- $\frac{6y_3^5}{y_4^4}$ for $0 < y_3 \le y_4$
- $\frac{7y_3^6}{y_4^4}$ for $0 < y_3 \le y_4$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{6y_3^5}{y_4^4}$ for $0 < y_3 \le y_4$

10) Evaluate $E[Y_3 | Y_4 = y_4]$ *1 point*

- $\frac{7y_4}{8}$
- $\frac{5y_4}{6}$
- $\frac{3y_4}{4}$
- $\frac{6y_4}{7}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{6y_4}{7}$