Unit 4 - Week 3

Assignment 3

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

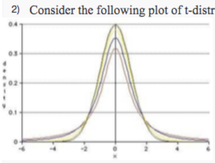
Due on 2020-02-19, 23:59 IST.

1) If X1, X2, X3…Xn are distributed as N(0,1), then what is the distribution of $\sum Xi^2$? *1 point*

- $\Gamma\left(\frac{1}{2}, 1\right)$
- $\Gamma\left(\frac{1}{2}, \frac{n}{2}\right)$
- $\Gamma(1, n)$
- $\Gamma\left(\frac{1}{2}, n\right)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\Gamma\left(\frac{1}{2}, \frac{n}{2}\right)$

2) Consider the following plot of t-distributions with varying degrees of freedom (brown is the normal distribution): *1 point*



The correct order of increasing degrees of freedom is (Red R, Blue B, Yellow Y)

- B<R<Y
- Y<B<R
- R<B<Y
- Y<R<B

No, the answer is incorrect.
Score: 0
Accepted Answers:
R<B<Y

3) Let X, Y, Z be independent random variables with $X \sim \Gamma(\lambda, a)$, $Y \sim \Gamma(\lambda, b)$, $Z \sim \Gamma(\lambda, c)$. Then, find out distribution of $\frac{X}{X+Y+Z}$. *1 point*

- $\beta(a, a+b+c)$ (Beta I)
- $\beta(a, b+c)$ (Beta I)
- $\beta_2(a, b+c)$ (Beta II)
- $\beta_2(a, a+b+c)$ (Beta II)

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\beta(a, b+c)$ *(Beta I)*

4) Let X, Y, Z be independent random variables with $X \sim \Gamma(\lambda, a)$, $Y \sim \Gamma(\lambda, b)$, $Z \sim \Gamma(\lambda, c)$. Then, find out distribution of $\frac{X}{Y+Z}$. *1 point*

- $\beta(a, a+b+c)$ (Beta I)
- $\beta(a, b+c)$ (Beta I)
- $\beta_2(a, b+c)$ (Beta II)
- $\beta_2(a, a+b+c)$ (Beta II)

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\beta_2(a, b+c)$ *(Beta II)*

5) Suppose you go to the bank to a make a deposit and are equally like to find 0 or 1 customer ahead of you. The times of service of these customers are independent and exponentially distributed with parameter λ. What is the cdf of your waiting time? (t>0) *1 point*

- $1 - \frac{1}{2}e^{-\lambda t}$
- $\frac{1}{2} - \frac{1}{2}e^{-\lambda t}$
- $1 - e^{-\lambda t}$
- $\frac{1}{2}e^{-\lambda t}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$1 - \frac{1}{2}e^{-\lambda t}$

6) Assume that a school district has 5,000 6th graders. In this district, the average weight of a 6th grader is 80 pounds, with a standard deviation of 20 pounds. Suppose you draw a random sample of 50 students. What is the probability that the average weight of a sampled student will be less than 75 pounds? (You can refer online to https://www.safaribooksonline.com/library/view/reliability- engineering/9781118841792/bapp03.xhtml for standard normal table) *1 point*

- 0.2014
- 0.4013
- 0.0392
- 0.96080

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.0392

7) Rahul's parents deposit an amount every year on his birthday worth $y, where y is a random variable distributed as Poi(0.1*n), n being Rahul's current age. When Rahul is 20 years old, find out the probability that the total amount deposited in the bank is $21: *1 point*

- 0.0867
- 0.833
- 0.9132
- 0.167

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.0867

8) If $X \sim \beta(m, n)$, then find the distribution of $\frac{X}{1-X}$. *1 point*

- $\beta_2(m, n)$
- $\beta_2(m, m+n)$
- $\Gamma(m, n)$
- $\Gamma(m, m+n)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\beta_2(m, n)$

9) Suppose you plan a road trip across 6 cities. Between every two consecutive cities, there is a toll tax counter which has a queue and corresponding waiting time distributed as Exp(5). Also, the waiting time across any two counters is independent. Then, calculate the variance of the total waiting time encountered during the trip at the counters: *1 point*

- 5
- 1
- 0.2
- 0.04

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

10) If X1, X2... Xn are iid U(0,1), and P = X1X2...Xn, then the variable −2lnP is distributed as: *1 point*

- $\chi^2(n)$
- $Z(0,1)$
- $Z(2n,n)$
- $\chi^2(2n)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\chi^2(2n)$